

TECHNOLOGY DEPT.

The Chemical Age

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16 JULY 1949

No 1566

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*"Jnl. of Soc. of Chem. Ind."
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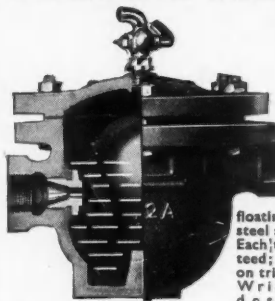
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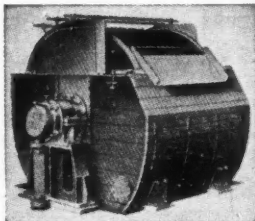
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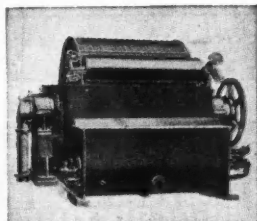


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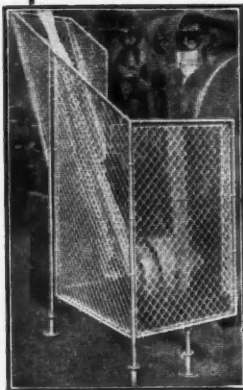
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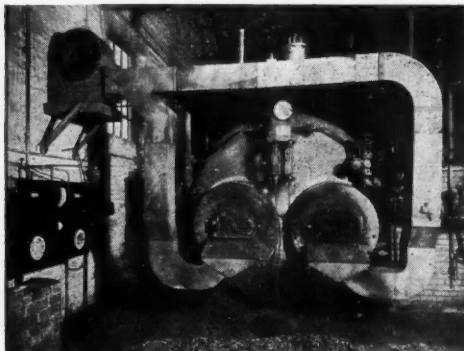
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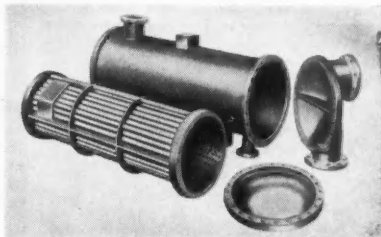
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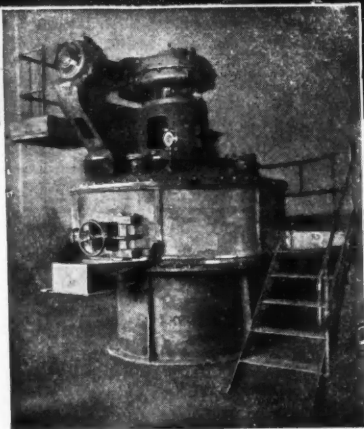
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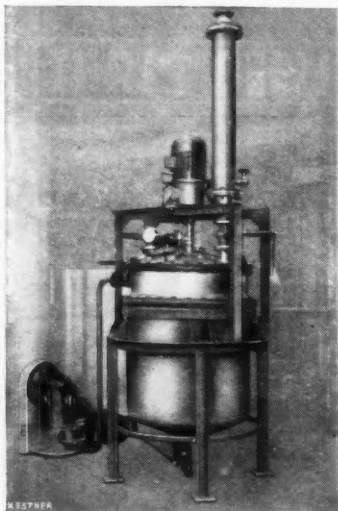
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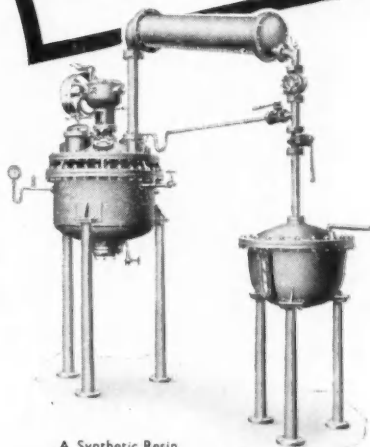
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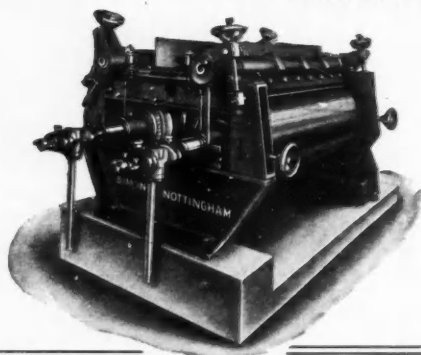
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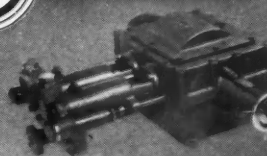
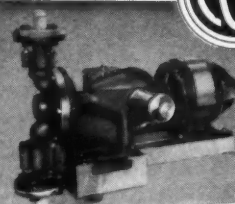
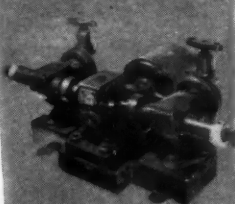
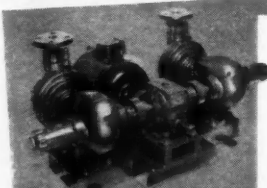
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Volume LXI

16 July 1949

Number 1566

Mineral Wealth—Or Poverty?

THE dependence of chemical industries upon mining and metallurgy for a large part of its supplies is one of the basic principles which are too familiar to receive much serious attention. It is appropriate, therefore, that the fourth Empire Mining and Metallurgical Congress in London and other parts of the country this week has riveted attention upon the decisive character of the work being done by British mining engineers and metallurgists both here and in the many varied mining areas of the Commonwealth and Empire.

No one could doubt this new awareness who witnessed the impressive gatherings which have assembled at London's Guildhall on Monday for the Congress banquet, distinguished by the presence of the Duke of Gloucester, and the subsequent meetings in other parts of the country. The character of this support is the best evidence of the heightened recognition of the importance of improved technology in winning and making the best use of all the multiplicity of minerals within the Commonwealth. The gathering in the Guildhall was capable of being mistaken for a United Nations assembly, bringing together as it did some of the foremost workers in the mining and metallurgical fields in each of the British countries, those of

Western Europe and the U.S.A., under the presidency of Sir Henry Tizard, whose leadership in what is being done in Great Britain to extend our resources by scientific means enables him to speak with special authority. He has, moreover, seen much of the work being done around the world to make minerals available for industry and, what is perhaps equally as important at the moment, has a clearer perception than most of the rate at which these vital reserves are being expended.

He gave a salutary reminder of this factor in the course of his presidential address to the Congress. "Everyone," he said, "knows that coal and iron are essential to our modern civilisation. Not everyone knows the great importance of the rarer metals, the names of some of which they would hardly recognise. Indeed, the whole of our material civilisation depends on drawing on the capital resources of the earth. We discover the places where Nature has concentrated minerals in a way that we do not understand; we extract them, we concentrate them and refine them still further, and then dissipate them completely in use. That process obviously cannot go on forever. For how long will it go on? We have reached the stage where this question is not of academic interest

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only; it is rapidly becoming one of real practical importance.

"In my lifetime more irreplaceable minerals have been dissipated than in the whole previous history of the world. The rate of consumption goes on increasing, and no one is going to put a limit to the rate. No one can be certain, from existing knowledge, that some of the metals on which so much depends, such as lead and tin, will be available in sufficient quantity in a hundred years' time. . . . Broadly speaking, it is true to say that the rate of discovery of minerals of economic importance has been pretty steadily going down for 20 or 30 years. . . . Many people will pooh-pooh the suggestion that many mineral deposits will be exhausted within 100 years. They will say, and rightly say, that such stories have been told before, and have been proved false by events."

Uncertainty is, in short, the keynote of the present situation facing those who seek to create firm estimates of what is the total store of some of the most indispensable materials and what period will elapse before that store is empty. To make confident prediction even more difficult, future rates of consumption are also unknown factors

which advances in fundamental knowledge and changes in technical processes can transform out of all recognition. It is happening already, and the still uncharted potentialities of nuclear physics seem capable of accelerating that process in startling fashion. Predicting that our coal reserves may last "at least another 1000 years," Sir Henry Tizard foresees that within that time even the rarer metals may come by synthesis from other elements (platinum to gold is a current, expensive possibility). But what may not happen in the interval?

Because much of the evidence available bearing upon the prolongation of these vital supplies is of a conflicting character, and has so often disproved all the forecasts, Sir Henry Tizard wisely refrains from assuming the rôle of a prophet. He has, however, made clear to the congress that, whatever is the truth about these subterranean resources, no acceptable solution of the problem of supplying rapidly changing needs, now and in years to come, will be reached without the fullest collaboration of scientists of many kinds. The challenge now is no longer to mining geologists and engineers alone, and it cannot safely be ignored.

Notes and Comments

SCI in Manchester

THE ability of the Society of Chemical Industry to procure the willing collaboration of chemists in many countries has been apparent again in Manchester this week, where that organisation has been holding its annual general meeting—the 68th. Like the concurrent fourth congress convened by the Empire Council of Mining and Metallurgical Institutions, with which it has a good many points of common interest, the society has had gratifying evidence this week of its continued capacity to rally members and distinguished collaborators from most quarters of the globe when it holds its major assemblies. The most obvious example of this has been the very welcome return of the president for 1948-49, Sir David Rivett, whose responsibilities as chairman of the Australian counterpart of our Department of Scientific and Industrial Research normally enforce a separation of some 13,000 miles. His presence, however, was only one of the proofs of the growing international standing of the SCI, which was reflected also in the considerable proportion of speakers and auditors from overseas and in the award on Wednesday of the Society's 1949 Medal to Dr. Foster Dee Snell, the New York consulting chemist and chemical engineer. This medal is conferred once in two years for conspicuous services to applied chemistry "by research, discovery, invention or improvements." The election of Mr. Stanley Robson to succeed as president Sir David Rivett, for whom he has so frequently deputised, was announced this week.

Capricious Copper Prices

FOR a few days this week customers of the Ministry of Supply had the unaccustomed privilege of being in almost as favourable a position as American users of some basic metals. By the very welcome reduction of the Ministry's prices electrolytic copper, pig lead and zinc were brought approxi-

mately to parity with those supplies in the U.S.A., if one excluded the substantial additions here for freight charges. That happy position prevailed for about three days. Then the upward trend in American nonferrous metal prices, of which there had been easily recognisable signs, upset the short-lived equality. The U.S. price for electrolytic copper jumped to 17½ cents per lb., with the result that the Ministry's price tickets had hastily to be changed. Copper, cut by £13 10s. per ton a few days before, was raised again to the extent of £3 10s.—to £107 10s. Consumers have ruefully observed that this was the swiftest adjustment to an American price change on record. That sensitiveness to changes in the transatlantic market has not been noticed when markets were falling. Has the Ministry, by chance, also observed that American lead prices too, were becoming perceptibly firmer this week?

Dramatic Interlude

INDUSTRIAL chemistry does not dramatise itself; all the evidence points in the opposite direction. Yet some of the processes by which the prosaic products of the industry are made are replete with possibilities which call for something more than technology and training can confer. Examples of this super quality occasionally come to light, usually belatedly, revealing outstanding courage and devotion to duty, the need for which is always present where some processes are carried on. An incident of this kind, which occurred last December, is, for once, described in something approaching its true dramatic context in the report of the recent 27th meeting, in Blackpool, of the I.C.I. Control Works Council. The story is told in the current issue of the *I.C.I. Magazine*. The principal figure was Mr. J. D. Leech, shift foreman of the ammonia synthesis plant at the I.C.I. Billingham works, to whom was awarded the company's

bravery medal, "for exemplary devotion to duty, outstanding courage and extraordinary presence of mind in most difficult and dangerous circumstances." Regardless of his own safety, Mr. Leech tried to trace and isolate a leak of gas—at the high pressure of 250 atmospheres—which had suddenly developed at one end of his plant building. His 20 years' experience can have left him in no doubt of the risk he accepted when, having found it impossible to distinguish in the dust storm which had developed the pipe in the complex equipment from which the gas was escaping, he switched on the general alarm—and remained to do what he could to reduce the risk of a heavy explosion. He was in fact caught in the centre of the explosion, but he stayed close to the subsequent fire to isolate and blow down the near-by high pressure equipment, so as to prevent further gas leakage. He kept full control of the situation until the arrival of help, although badly shaken. The I.C.I. "citation" notes that Mr. Leech minimised the damage, so that there was little loss of ammonia or methanol production. That, however, is manifestly not the most important moral to be drawn from this heartening sidelight on industry.

Chemists and the BAC

FEW activities have changed their aspect so profoundly or so quickly as contemporary chemistry, which today requires of its practitioners a greater flexibility of mind than does almost any other calling. Yet chemists as a body are harder to convert than some admitted reactionaries. The predominant evidence is the immutable indifference which chemists have maintained for more than a decade in the face of numerous good arguments why they should actively collaborate in the practical work of the British Association of Chemists. The latest of a long series of appeals which has been addressed to chemists on this subject is made in the principal article in *The British Chemist*, the new and improved form of the association's journal—which has been run at a loss, although

all that it contains is of intimate concern to chemists. The current appeal for wider backing for "the only trade union catering exclusively for chemists" does not disguise the fact that the interests shown by the majority of chemists falls short of attending meetings—of which some held recently in collaboration with the Royal Institute of Chemists should have appealed to all of them—and questionnaires are useless. So few respond. The journal points to a great variety of ways in which the BAC could render valuable service to chemistry and to chemists, but all are conditional upon a heightened measure of support, of which there are at the moment no very encouraging portents.

Dislike of Group Control

AT a time when trades unionism has gained a wider hold than ever before it is curious to observe that chemists' reluctance to have their affairs administered by a central authority appears to be as strong as ever it was. That was reflected in a different connection by the coolness shown towards the Government-sponsored central technical register. The fact that the BAC is qualified to perform functions beyond the scope of any ordinary trade union does not appear to have converted many from their dislike of the possibility of control by a group. Meanwhile, the sympathy which must be felt for the BAC in the frustration of some of its well-intentioned efforts may be tempered with respect for this preference by chemists for individualism. The BAC, which is almost as remote from Transport House policies as any organisation of that kind can be, seems, however, undeservedly to have been condemned to repeated discouragement in its self-appointed rôle as a guardian of professional interests in such relatively uncontroversial spheres as chemical education and public relations. It remains, however, the custodian of an unemployment fund of some £48,000, on which, it is agreeable to note, so few demands are made that it is now five times as large, per member, as the equivalent fund of the Medical Defence Union.

BRITISH BASE METALS

Need to Re-Create a Free Market

A COMPREHENSIVE survey of the progress of the British Non-Ferrous Metals Federation was given by the retiring president Mr. Horace W. Clarke, in his report to members at the recent annual general meeting.

It was to be regretted, the president said, that four years after the end of war affairs were such that the Government continued to be sole purchasers of the raw materials, the single arbitrator of price, and only source of supply.

"As you all know," he said, "we have to-day no freedom to buy our raw materials where we please. We are compelled to purchase from the Ministry of Supply at the price which they themselves fix—a price which is to-day some £30 a ton above the world price."

"We have from the outset taken the initiative in pressing the Government to reduce its price to the world level, and since the period at the end of April, when the American price began to fall rapidly, there have been two substantial reductions in the Ministry of Supply price for copper and other virgin metals. I think it is fair to say that these reductions were largely due to the activities of the federation." (Further reductions made this week are reported on page 78).

"End Bulk Purchase"

The re-opening of the London Metal Exchange, continued the speaker, would be welcomed by the federation, subject to proper safeguards and certain modifications of pre-war practice. The federation considered that the time had now come to end the practice of bulk purchase, and return to conditions of a free market.

The International Conference of Non-Ferrous Metal Manufacturers, formed in 1946, continued to make satisfactory progress and Mr. Roland Finch had been re-elected president.

The monthly bulletin, prepared and published by the statistics department of the federation, had achieved world-wide success.

The importance of research and scientific work was fully appreciated by the federation, and substantial support had been given to the British Non-Ferrous Metals Research Association, of which all federated associations and federated firms were automatically collective members.

The problems of combining administrative ability and the necessary technical

(Continued at foot of next column)

LONDON METAL EXCHANGE

No Free Market

HOPES that the many representations that have been made in favour of reopening of the London Metal Exchange might now have produced a change in Government policy were dissipated this week, although the possibility that a freer system of distribution of tin appeared to have been improved. (A slight reduction in tin prices, to £553 10s. per ton, was recorded in Malaya this week.)

The decision affecting the London Metal Exchange was given by Mr. G. Strauss, Minister of Supply, in the House of Commons on Monday. Replying to several questions, Mr. Strauss said he had carefully considered commercial and industrial representations on the advantage of re-opening the exchange, in particular the hedging facilities which that would provide.

It was, however, generally accepted that a free market in non-ferrous metals would have to be severely restricted to prevent a loss of dollar resources, and he was convinced that those limitations, if they were to be effective, would so restrict the freedom of the market as largely to nullify the benefits which its advocates desired to bring about. Even more important, the abandonment of bulk buying of those commodities from Commonwealth countries would seriously endanger our supplies from those sources and make us more dependent on dollar purchase.

For those reasons he was at present unable to agree to the re-opening of the Metal Exchange for the purchase and sale of copper, lead, and zinc. Other considerations applied to tin, which was now the subject of international discussion. He had not reached any conclusion about the future marketing of tin.

Questioned further if he would make base metals available at world prices, Mr. Strauss said new prices were being fixed for copper, lead, and zinc, which would bring them on a par with prices in the United States. (Page 78, this issue.)

knowledge were being tackled by the training and education sub-committee of the federation under the chairmanship of Mr. Arthur Johnson.

The president concluded by saying that a strong and representative team had been selected to visit the U.S.A. under the scheme organised by the Anglo-American Productivity Council, and it was expected that much useful knowledge would be gained.

Further Reduction of Base Metal Prices Disparity of British and American Rates Reduced

PRICES of copper, lead and zinc in Britain have been reduced as from July 12.* The Ministry of Supply, in a note this week, states that the reductions in the selling prices, taking into account freight, delivery charges and other factors, bring home prices for these metals into line with those current in the U.S.A.

The Ministry of Supply observes that the Exchequer will have to bear a loss, the size of which depends on how future price movements affect values of stocks in hand. Because of the present unstable nature of the market in non-ferrous metals, the Ministry has, for forward purchases, instituted a new arrangement, under which users can continue to buy forward up to six months' requirements for copper and zinc, and three months in the case of lead. The buyer will, however, have to pay a premium as an insurance against a rise in prices.

The new prices and the previous prices (per ton delivered) are:—

	New price		Old price	
	£	s.	£	s.
Electrolytic copper*	104	0	117	10
Good soft pig lead	75	10	82	0
Good ordinary brand zinc	58	0	78	0

Discounts and premiums remain unchanged.

The Ministry's buying price for rough copper in slabs of from 2 cwt. to 3 cwt. is reduced from £80 to £70 per ton. The prices of zinc oxide are also reduced to the following figures for lots of not less than 2 tons, delivered to the buyer:

	New price		Old price	
	£	per ton	£	per ton
Red Seal ...	58	15 0	75	15 0
Green Seal ...	60	5 0	77	5 0
White Seal ...	61	5 0	78	5 0

Licences to acquire copper and zinc will now be granted only against: (1) A declaration that the metal is required to cover orders; (2) a declaration that in the case of applications for virgin metal full allowance has been made for the expected intake of scrap; (3) the usual purchase order on the Directorate of Non-Ferrous Metals, giving details of specification, delivery, etc., required, or a statement that the applicant intends to purchase from a stockist.

This means that the condition—suspended on June 1—that applications for licences had to be accompanied by a signed declaration that the metal was required to cover orders, is now reimposed. The period of validity of the licences remains unaltered.

Additional charges ranging from £2-£4 per ton will be made on orders booked for forward delivery.

Orders for copper and zinc will not be accepted for delivery more than six months after the end of the month of order, or for lead for more than the period of the quota (at present three months) under the rationing scheme. Sales for delivery in any one calendar month will be limited to a quantity which does not exceed, or does not substantially exceed, the customer's normal monthly consumption.

UNIVERSITY WILL HELP SCOTTISH MINERAL RESEARCH

THE Scottish Council (Development and Industry), is to have the collaboration of Glasgow University in one of two investigations this summer into the mineral resources of Scotland. Eight students of the university have been chosen to assist in the investigation, which will be devoted primarily to the location and examination of deposits of talc, dolomite, feldspar, and serpentine. The Scottish Council has agreed to grant money to permit the students to undertake work of a wider nature than would otherwise be the case.

Among the areas to be prospected are

the Shetland Islands, the Highlands, and the Western seaboard.

Discussing the investigation, Mr. W. S. Robertson, Scientific Contacts Officer, said that more precise information was required than had been afforded by previous surveys. In the case of dolomite, employed by steelmakers, the exact constitution of any individual deposit was of primary importance. It was thought possible that dolomite might also be used as a source of magnesium.

Another investigation sponsored by the Scottish Council will be a survey of the stone-building industry, with a view to establishing the reasons for the considerable price difference between stone and brick houses.

* The further adjustment of the Ministry's price for electrolytic copper, in response to the rise in the U.S. price, to £107 10s. per ton is referred to in "Notes and Comments" (page 75, this issue).

BID TO DISINTEGRATE DU PONT

U.S. Attack on Largest Chemical Producer

SEEKING to dissolve what has been termed "the largest single concentration of industrial power in the United States," the U.S. Attorney General last week filed a sweeping anti-trust suit in the Federal District Court, Chicago, on behalf of the Department of Justice. In addition to more than 100 individuals, including leading members of the du Pont family, the principal corporate defendants are E. I. du Pont de Nemours and Co., Inc., the General Motors Corporation, of Detroit, Michigan, the United States Rubber Company, of New York, and the Christiana Securities Company and Delaware Realty and Investment Corporation, two holding companies of the du Pont family.

The civil action aims to break up the \$1588 million du Pont organisation, which includes a \$560 million investment in the General Motors Corporation. The du Pont organisation dates from 1802 when Eleuthere Irenee du Pont borrowed \$36,000 to make gunpowder.

Share Disposal Objective

The chief objective of the suit, which has required more than 18 months' preparation, is to secure the disposal by du Pont of its 10 million-share investment in the General Motors Corporation, which represents 23 per cent ownership and affords virtual control, since the remaining 34 million shares are spread over about half a million stockholders in small lots. The Government also wants the du Pont family to sell all its holdings in the U.S. Rubber Company, in which it holds 17 per cent of the shares.

Other objectives of the Government are to enforce the sale by du Pont of its business of making tetraethyl lead, ethyl fluid and ethyl chloride; the sale by General Motors of its 50 per cent stock interest in the Ethyl Corporation, which makes "anti-knock" fluid for blending with motor spirit; the sale by du Pont and General Motors of their interests in Kinetic Corporation, a manufacturer of refrigerants; the cancellation of all existing contracts between du Pont, General Motors and the U.S. Rubber Company relating to the sale of products, the grant of licences, agreements to license under patents, and agreements providing for the exchange of technical information.

Charging the companies with combining

and conspiring to violate the Sherman and Clayton act in the "development, production, manufacture, distribution and sale" of their products, the Government's 63-page complaint contains charges that the units of the group maintained restricted agreements, excluding outside suppliers, and employed preferential price scales among themselves, that they exchanged patents and technical information on an exclusive basis, eliminated competition and formed jointly owned subsidiaries, such as the Kinetic Corporation.

Three Largest Manufacturers

According to the Government, the du Pont enterprise is the nation's largest producer of explosives, powder and chemicals, General Motors is the nation's largest manufacturer of automobiles, trucks, and railroad diesel engines, and "the largest manufacturing company in the United States," while the United States Rubber Company is the country's largest manufacturer of tyres and tubes.

While officials of the General Motors Corporation have not yet commented on the action, denials of the charges have been issued both by Mr. Crawford H. Greenewalt, president of du Pont, and by Herbert E. Smith, chairman of United States Rubber.

Mr. Greenewalt said: "The du Pont Company emphatically denies that its relationships with General Motors and the other companies mentioned in the complaint have been either illegal or in any way detrimental to the interest of the people of the United States. On the contrary, these relationships have served the public interest in a conspicuous way; and in that firm belief we will defend our actions and our present position with the utmost vigour."

Leader in Competitive Industry

Mr. Smith said: "The United States Rubber Company is a leader in one of the most highly competitive industries in America. We are in business to serve the public by providing the best possible products at the lowest possible prices."

In 1947 the combined assets of the three defendant corporations, according to Government figures, were \$4250 million, their combined sales totalled \$5189 million and their net income after taxes \$429 million.

Chemical Statistics for April

Production Levels Maintained

BASIC chemicals in April showed little change either in consumption or production compared with the previous month. Production and stocks generally showed a slight reduction compared with April, 1948, except in the case of pig iron and steel ingots and castings.

There was a slight decrease in the total estimated numbers employed in April in the chemical and allied trades, compared with the March figures. Distribution (in thousands) was as follows: coke ovens,

chemicals and dyes, and explosives 250.9 (184.1 men, 66.8 women); paints and varnishes 37.3 (26.2 men, 11.1 women); oils, greases, glue, etc., 64.0 (51.0 men, 13.0 women); pharmaceutical, toilet preparations, etc., 79.4 (40.6 men, 38.8 women). Total 431.6 compared with 432.0 in March.

These figures and the representative tables given below are extracted from the latest issue of the *Monthly Digest of Statistics*, No. 42, June (HMSO, 2s. 6d.).

	April, 1949			April, 1948		
	Production	Thousand Tons Consumption	Stocks	Production	Thousand Tons Consumption	Stocks
Sulphuric acid	139.2	135.0	—	129.0	140.0	—
Sulphur	—	24.7	72.3	—	21.4	88.6
Pyrites	—	20.6	76.6	—	20.6	81.0
Spent oxide	—	15.9	168.0	—	16.4	167.0
Molasses (cane and beet)	10.3	26.8†	284.2	12.2	27.9†	187.9
Industrial alcohol (mil. bulk gal.)	1.86	2.39	5.07	1.81	2.84	5.96
Superphosphate	18.1	22.3	—	22.5	28.5	—
Compound fertilisers	142.2	210.4	—	184.7	230.8	—
Liming materials	—	430.9	—	—	413.3	—
Ammonia	—	6.94*	—	—	6.06*	—
Phosphate rock	—	82.1	174.7	—	91.8	201.0
Virgin aluminium	2.66	15.8	—	2.62	14.3	—
Virgin copper	—	23.6	115.4	—	33.3	84.3
Virgin zinc	—	13.6	50.6	—	19.1	38.8
Refined lead	—	13.7	33.9	—	17.7	34.1
Tin	—	1.62	20.5	—	2.30	12.6
Zinc concentrates	—	14.4	28.0	—	14.9	68.0
Pig iron	187.0*	—	260.0*	184.0*	—	184.0*
Steel ingots and castings (including alloys)	316.0*	—	1,097.0	293.0*	—	793.0
Rubber: Reclaimed	0.32‡	0.40‡	3.62‡	0.48‡	0.49‡	3.67‡
Natural (including latex)	—	3.28‡	47.0‡	—	4.06‡	140.3‡
Synthetic	—	0.04‡	1.82‡	—	0.05‡	2.05‡

* May.

† Distilling only.

‡ Average of five weeks.

SPREADING INDUSTRIAL ELECTRICITY'S WINTER LOAD

AS a result of experience gained last year the Electricity Sub Committee of the National Joint Advisory Council recommended that the same general administrative arrangements should be made for the coming winter.

With the fuller knowledge gained of the incidence of the peak load, it has been found possible to allow some easement in the contribution asked of industry.

During December, January and February as compared with the maximum load during the corresponding period of 1946-47 industry will be asked to cut its maximum peak demand on Mondays to Fridays inclusive by 20 per cent during the hours of 8 a.m. to 10 a.m., but during the hours of 10 a.m. to 12 noon the reduction asked for will only be 10 per cent.

From December 1, until January 15, a

reduction of 20 per cent will also be necessary between the hours of 4 p.m. to 5.30 p.m. on Mondays to Fridays inclusive, but after that date the problem of the afternoon peak is to be left to the discretion of the regional boards.

The Government is asking the regional boards for industry to make the necessary arrangements to give effect to the cuts and will give them full support.

While the Government are confident that both sides of industry will once again show the same spirit of co-operation which has characterised these arrangements in the previous two winters, they have decided, in fairness to all public-spirited employers and workers, that statutory powers shall continue to be available to deal with unreasonable failure to operate approved load spreading arrangements.

GERMANY SEEKS NEW FOREIGN CONTACTS

New Vitamin B₂ Preparation in Production

IN view of the increased importance of export trade for West German industry, chemical manufacturers in the Anglo-U.S. zone have lately raised the demand that German experts, and in particular German trade associations, should be allowed to participate in commercial negotiations with foreign countries. They complain that trade agreements concluded by the occupying powers without "adequate" German participation have led to foreign competition in the German market which, "especially in the chemical industry, is already giving rise to serious apprehension."

The work for a European customs union, which has received considerable publicity in the German Press, is being watched with misgivings, because it is thought that it may result in "very grave complications" for the German chemical industry. Efforts are to be made to establish contact with foreign chemical organisations. As far as chemical plant expansion projects under the European Recovery Plan are concerned, German chemical circles hint that many of these are "contrary to natural conditions."

The extension of the trade agreement between the Anglo-U.S. zone of Germany and Sweden provides for shipments of German chemicals to Sweden to the value of nearly £1.6 million and a reciprocal acceptance of Swedish chemicals valued about £140,000 in the 12 months ending June, 1950.

Foreign Holdings

The plant of Kalle & Co., A.G., at Wiesbaden-Biebrich, will be the first of the former I. G. Farbenindustrie works to be offered for sale. Details of the procedure to be followed at this sale, which is described as a "test case," have not yet been completed, but it is understood that, as foreign interests held about 20 per cent of the I. G. Farbenindustrie capital, 20 per cent of the shares of a new company formed to take over the Kalle & Co. plant are to be reserved for possible later disposal to foreign interests.

The production of sulphuric acid is to be undertaken shortly in the western sectors of Berlin. In view of the inconvenience experienced during the blockade it is intended to establish suitable plant at the Berlin-Tegel gasworks; in addition to sulphuric acid, it will produce ammonium sulphate. About half the present acid requirements of Western Berlin are

expected to be met by production at Tegel. The quantity involved is, however, small, as consumption has declined from about 3500 tons a month in normal times to between 300 and 400 tons.

A new process for the production of vitamin B₂ from whey has been developed by Herr Funck, a chemist of Beyer-Chemie GmbH at Saalfeld. The new preparation is to be marketed under the trade name of "Viteusan-Funck-Beyer." Several thousand ampoules can be produced daily, and it is reported that the production process requires only two days.

The production of silicones is to begin shortly at the plant of Chemische Fabrik von Heyden at Dresden-Radebeul. The process to be used is said to have been developed during the war, based on research work carried out as early as 1934. The production of sulphonamides is to be undertaken in a new plant, and several new synthetic drugs are to be made, some of them on a salicylic acid basis.

German Technical Reports

THE Board of Trade announces that the following reports on German industries are now available from H.M. Stationery Office:

BIOS 1632. I. G. Ludwigshafen and Hoechst. Notes on the manufacture of sulphuric acid and of vanadium catalyst. (2s.)

BIOS 1839. Welding of plastics in Germany. (22s. 6d.)

BIOS 1861. Light alloy foundries in Germany. (20s.)

BIOS 1869. Manufacture of synthetic phenol by the chlorination route at I. G. Farben Industries. A. G. Leverkusen. (5s. 6d.)

Additional summaries, considered unsuitable for publication, may be inspected at the TIDU, 40 Cadogan Square, S.W.1. They are:—

FD 3007/48. Interrogation of Dr. Demant of Peenemunde West—Notes on liquid propellants.

FD 3046/48. German pyrotechnic dyestuffs and synthetic consolidating materials to obviate the pressing of pyrotechnic compositions.

FD 1072/1948. The anthraquinone autoxidation process for the production of hydrogen peroxide; a description of the above process and some details of a new still and column for purification and concentration.

NEW RUBBER USES

Competitive Products for Ceylon?

NOVEL methods of employing rubber to produce wood preservatives, insecticides, varnishes, paint thinners, and even paints (if colour powders are provided) are the subject of claims being made in Ceylon.

State assistance is being sought for the commercial adaptation of the processes involved, and it is claimed the paint-thinning preparations, wood-preservatives, and insecticides produced from rubber are as effective as turpentine, linseed oil, etc., and could be marketed for about half the price.

Before representations for State aid were made to Mr. G. G. Ponnambalam, Minister of Industries and Industrial Research, the new products are stated to have undergone extensive tests over a period of some months.

If the Government assistance is granted, it is anticipated that the rubber-based products could serve as a substitute for Ceylon's present requirements of turpentine, linseed oil, etc., and would be competitive in world markets.

Shark liver oil supply centres in Ceylon are experiencing a boom as a result of the increased consumption of the commodity in the island. There are about ten centres supplying the Department of Industries and Industrial Research with the raw material for the production of shark liver oil.

A number of dealers in Colombo, who formerly obtained their entire requirements from abroad, now make their purchases exclusively from the department's factory, as the quality of the local product is found to be superior to imported oil.

The import of cod liver oil, which at one time was a serious competitor, has dwindled considerably. Another rival, halibut oil, no longer seems to offer any serious competition.

Steel Production Record

TOTAL production of steel during the first six months of 1949 reached 7,949,000 tons, the highest half-yearly output ever achieved. That was 384,000 more than the previous record, in the first half of 1948.

The British Iron and Steel Federation reports that June production was at an annual rate of 15,645,000 tons. This was the highest rate ever achieved in the month, despite interruption by Whitsuntide holidays this year.

FATAL ACCIDENTS INCREASE

Few in Chemical Plants

MORE fatal industrial accidents and deaths from industrial diseases occurred in May than in April, according to figures reported in the last *Ministry of Labour Gazette*.

Deaths from accidents in the course of employment in the United Kingdom in May were 168 compared with 120 (revised figures) in April and 126 in May, 1948. Only three occurred in chemicals, oils, soaps, etc., while metal conversion accounted for five and other metal trades four.

Cases reported under the Factories Act, 1937, or the Lead Paint (Protection against Poisoning) Act, 1926, in the U.K. in May, disclosed one death in the oil industry due to epitheliomatous ulceration (skin cancer). Total cases reported under the two acts numbered 41, as follows:—Lead poisoning, four; compressed air illness, four; anthrax, three; epitheliomatous ulceration (skin cancer) 17 (pitch, nine; tar, six; oil, two); chrome ulceration 13 (manufacture of bichromates four; chromium plating, six; other industries, three).

BRIDGING THE DOLLAR GAP

IF we wanted to encourage the American investor, we must offer him reasonable security and a fair return, said Sir Norman Kipping, director-general of the Federation of British Industries, in a recent broadcast discussion with Mr. Robert Boothby, M.P. A programme of nationalisation was hardly calculated to inspire confidence in the security of industrial investments, he said.

With a few shining exceptions, British industry had barely started to drive into the dollar markets. There had so far been no incentive to British firms to concentrate on these markets, the most difficult in the world.

The problem had no easy answer and it could not be solved by any financial conjuring trick. It was a tough job for British industry, but it was not the first that we had tackled. Our national life now depended on the individual British manufacturer and merchant, and he was not beaten yet!

All-Party Government

"The Business Case for an All-Party Government" will be discussed at a British Sales Promotion Association luncheon meeting, at the Holborn Restaurant, London, W.C.1, on July 27.

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S. AFRICA'S SODA ASH

Home Yield of 300 Tons Daily?

PLANs for South Africa's first soda ash factory are well under way, and it is hoped that work on the £5.5 million project to be established near Douglas in the Northern Cape will begin within the next few months. The realisation of the seven-year-old project is expected to confer important benefits on local industries. There is thought to be a possibility that, when production begins, probably in 1953, imports of soda ash may stop.

Processed steam to afford power for the factory will need up to 3000 kW. The factory will need 10 million gallons of water and about 1000 tons of coal a day and the soda ash output aimed at is 300 tons a day.

British and U.S. Supplies

Before the war, soda ash was imported from Germany and Japan. Lately the Union has been getting supplies from London and America. The soda ash factory will be the Union's biggest concern, apart from the steelworks in Pretoria. The work had been hampered by insufficient supplies of brine. Now a Johannesburg mining enterprise has bought for £70,000 1200 morgen of a farm on the banks of the Vaal River near the Broadway railway siding, where the factory will be established. The mining company has been spending £12,000 a year looking for an adequate brine supply; now the pumping site has been practically decided. The brine will be pumped through 22 miles of pipeline, laid at a cost of £100,000.

Rich Source of Salt

The brine source is a 200-morgen salt lake which produces 50,000 tons of salt a year—a third of the Union's salt output.

The district has a number of salt-pans which could be used for the supply of brine—but the finest salt-pan is hundreds of miles away between the red sand dunes nearly 200 miles from Upington. It contains an unparalleled supply of pure white crystallised salt in its circumference of 20 miles. It is believed that the mining firm has an option on the lake, but its remoteness and appalling roads militate against its exploitation. Could it be developed its yield might provide some 200,000 tons of salt a year. The Union's total salt production is about 120,000 tons a year, and about 80 per cent of this comes from pans within 100 miles of Kimberley.

PARLIAMENTARY TOPICS

Toxicity of Insecticides

REPLYING to a question by Mr. T. Driberg in the House of Commons last week, Mr. H. Morrison, Lord President of the Council, said the Agricultural Research Council and the Medical Research Council were aware of the potential dangers of the indiscriminate use of some of the new commercial insecticides and fungicides containing dangerous poisons, and there was a special toxicity sub-committee of the research co-ordinating committee on insecticides, a body appointed jointly by the Medical Research Council, the Department of Scientific and Industrial Research and the Agricultural Research Council, which arranged for the examination of new materials. As to the effect of insecticides and fungicides on plants, active and continuing research was in progress at several agricultural research institutes. In regard to the effect on human beings, the Agricultural Research Council worked in close collaboration with the toxicology committee of the Medical Research Council. The inquiries of that committee included long term studies.

* * *

A QUESTION by Mr. D. Lipson, to the Minister of Fuel and Power, drew from Mr. A. Robens the reply that at current prices the annual value of the British companies' share of the petrol production of Haifa refinery when working to full capacity would be about \$16 million. It would, however, take some months to restore the refinery to a full rate of production. The potential dollar saving to us would be somewhat less than this amount.

* * *

REPLYING to Sir W. Smithers, Mr. John Strachey, Minister of Food, said that during his recent visit to East Africa he found that about one-half of the groundnut crop and about one-sixth of the sunflower crop had been harvested. Yields at Kongwa would be very low this year owing to the drought which had affected the whole of East Africa so severely. From the crop so far harvested the yields averaged 245 lb. for groundnuts and 99 lb. for sunflower per acre. Nevertheless, the first small shipments of oilseed to the United Kingdom would be made shortly.

* * *

THE Ministry of Supply's stocks of virgin copper, including stocks abroad, and afloat, were stated by Mr. G. R. Strauss to amount to approximately 170,000 tons on June 30.

Spray Cooling Ponds

Basic Considerations for Effective Operation

by H. L. M. LARCOMBE

VERY often the process or power engineer in a chemical plant is confronted with the job of designing and building a spray cooling pond. He may be totally unacquainted with the design of such equipment and consults a text-book. Here he usually finds himself confronted with one of two things: a general description of a spray pond which contains no actual design data, or, alternatively, a long involved thesis with equally involved nomenclature on the theory of heat transfer from liquid water particles. There are few sources of information on spray ponds which give sufficient data for a practical unit to be built, without resorting to given data which will enable the non-specialist to design and erect a spray-pond which will give dependable operation.

Atmospheric Conditions

The cooling of water by spraying into the atmosphere is effected by evaporation, conduction and radiation. In the hotter months of the year most of the cooling is done by evaporation; in the colder months by conduction and radiation.

The temperature of water entering a spray system is reduced a fixed amount depending on two atmospheric conditions

—namely, the air dry bulb temperature, and the air wet bulb temperatures. This information should apply to the district and, if not readily available at the plant, it can usually be obtained from the local airport, newspaper, university or from the Meteorological Office publications. The cooling being less in the summer when the dry bulb temperatures are high, the average wet and dry bulb temperatures from May to September should be taken as the design basis.

In selecting the site for a pond, the engi-

neer should choose a spot where obstructions such as buildings, and high stock piles, do not restrict proper air circulation around the sprays. Too exposed a site, however, is also to be avoided as this would make windage losses high and possibly create a communal nuisance if too near a public thoroughfare. If space is limited and the spray nozzle clusters are arranged less than 12 ft. from the edge of the pond, a louvre fence should be installed. This should have a high percentage free area and be arranged so that the drips drain back into the pond. If the distance between the nozzle cluster and the edge of the pond is 25 ft. or more, the louvre fence may be dispensed with. A roof can be a good ground-conserving site for a spray pond, but in every case it is necessary to install a louvre fence to prevent wind loss.

Cooling Capacity

Fig. 1 shows the cooling which could safely be expected from a cooling plant when designed in the manner outlined in this paper. It assumes a 5-m.p.h. wind blowing. This chart is based on actual tests carried out over a period of twenty years by Spray Engineering Company in the U.S.A., and constant re-checking has

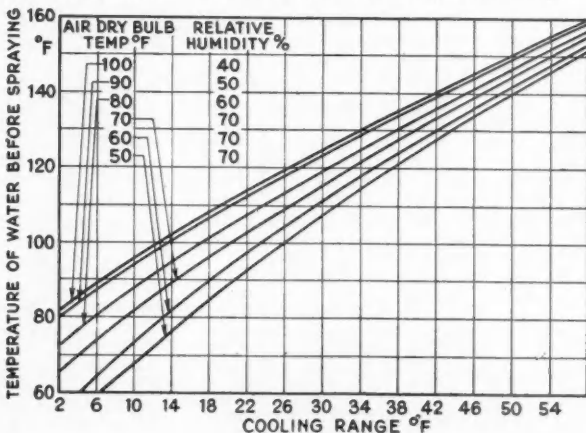


Fig. 1

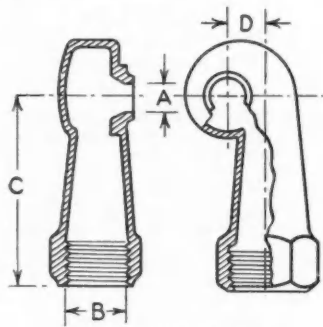
proved it to be accurate. The make-up water average does not exceed 2 per cent of the quantity of water sprayed. When the local atmospheric conditions are obtained, the relative humidity should be ascertained from psychrometric chart and used with the temperature of the water before spraying to find the cooling range through which the water will be cooled.

Nozzle Type

The type of nozzle¹ is probably the most important part of any spray pond. It should effect a fine uniform break-up of the water without having to exert an uneconomical high pressure. The droplets should not be so fine as to cause excessive wind loss and the spray height should be such as to get maximum cooling without having to resort to an excessively high louver fence.

The nozzle should not have a small orifice or small internal passages which could be clogged by pipe scale or foreign matter. It should have a large internal free passage way, first to pass solids, and second, to reduce the pressure required to operate it, consequently reducing the head on the feed pump and thereby saving power. A pressure too low, however, will not effect a good break-up and will merely eject an unbroken stream of water. The spray contour should be such that a wide hollow cone is initially formed which gives a maximum area in contact with the atmosphere.

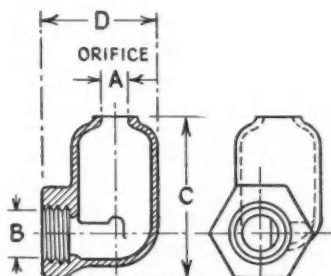
The form of nozzle which fulfils these



YARWAY TYPE-

A	B	C	D
7/8"	1 1/2"	7"	7/8"
1 9/64"	2"	9 1/2"	1 9/64"
1 3/8"	2 1/2"	12"	1 3/8"

Fig. 2



SPRAYCO TYPE

A	B	C	D
7/8"	1 1/2"	4 1/4"	3 3/4"
1 9/64"	2"	5"	4 1/8"
1 3/8"	2 1/2"	7 1/4"	5"

Fig. 3

requirements adequately is that shown in Fig. 2. It has been used successfully in practice over a long period and its full performance in all its sizes has been described more fully on a previous occasion. The best material for these nozzles for most general purposes is bronze, although certain contaminated waters may point to the use of more suitable corrosion-resistant material.

The practice of dispensing with nozzles and merely using lengths of perforated pipe is not recommended as it does not give a good spray form at low pressures and can also prove much dearer in initial cost.

The nozzle which is a good practical size has an orifice of not less than 1 in. with an operating pressure of 7 p.s.i. Good pattern nozzles are the Yarway Involute type and the American Sprayco type shown in Fig. 3. The recommended orifice sizes for these two types are 1 1/32 in. and 1 9/64 in. respectively, with an operating pressure of 7 p.s.i. These will give good service, although for the sake of the extra information, other orifice sizes are shown in Fig. 4.

The Flat-Spray nozzle has been suggested for spray pond work and although useful in places where space is limited, the nozzles are not usually made in the relatively large orifice sizes which are necessary to avoid clogging.

The details of construction of a pond will repay all the thought put into their design. Take the case of the piping and spray system first. Spray nozzles could be mounted in clusters of four in cruciform

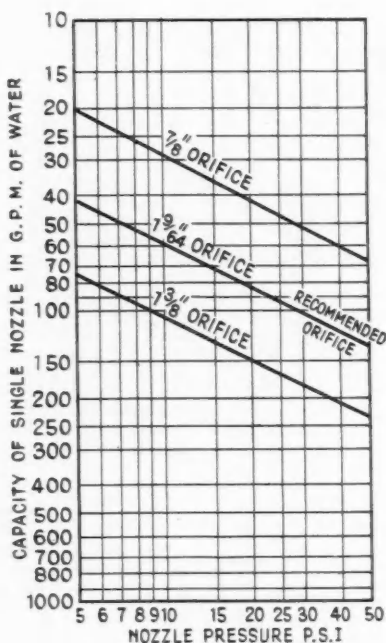


Fig. 4: Nozzle capacity

shape and be fed from a central supply line. A spacing which has been found satisfactory in numerous installations, using the type of nozzle shown in Figs. 2 and 3, is 18-ft. centres between the nozzle clusters along the supply pipes and 25-ft. between the rows of nozzle clusters and, as mentioned previously, 25-ft. from the edge of the pond where no louver fence is contemplated, and 12-ft. where a fence is found desirable or necessary.

The main supply line and branch supply lines should be installed on piers or supports resting on the bed of the pond. They should be anchored in such a manner as to allow for pipe expansion due to the hot water inside and a roller or knife edge skid used to take care of movement. The spray arms should be of galvanised steel to allow screwing and, although the material can be used for the main and branch supply pipes, it is considered better practice to use cast iron pipe and fitting for these. Pressure drop along the supply pipes can be calculated by the normal formulæ, the recommended

pressure shown in Fig. 4 should be maintained at the nozzle.

The nozzle should spray vertically upwards and be located approximately 5-ft. above the surface of the water level in the pond. To allow drainage from the piping system, it is usual to fit a drip spray which is normally about 1/4 in.-3/8 in. bore.

Where the pond basin is of concrete, it is advisable to have mastic expansion joints if the temperature of the water makes this necessary. Spacing for these expansion joints is normally about 25-ft. A suction well should be fitted with a screen to exclude foreign matter. If oil is present in the water being sprayed the suction well can be made in the form of an underflow trap so as to exclude oil at the pump suction.

The level of the water below the top of the tank should be at least 1 ft., exclusive of the louver fence and the depth of 2 to 3 ft.

Where a steel or cast iron tank is used, it is also necessary to consider expansion; this can be achieved by the usual methods associated with their construction.

BIBLIOGRAPHY.

- 1 "Principles of Pressure Spray Nozzles" H. L. M. Larcombe, *THE CHEMICAL AGE*, 25th. Oct., 1st. Nov., 8th. Nov., 1947.
- 2 "Cooling Condenser Water with Spray Ponds" J. D. Watson, *Industrial Power and Fuel Economist*, June, 1939.

Rain Repellent

A WAX-LIKE rain-repellent substance expected to assist aerial navigation has been patented by a scientist of the National Research Council of Canada. The rain-repellent, perfected after seven years' research by Dr. D. F. Stedman, of the Council's chemistry division, has proved successful under aircraft tests both in Canada and the U.S.A. The substance, when applied to the aircraft's windscreen, breaks down rain drops into droplets which are driven off into the air-stream. The action is so quick that to the pilot the windscreen appears dry. The materials used are non-corrosive and do not damage paint finishes. Other tests have been carried out by an RAF establishment in England and by the engineering staff of the Trans-Canada Air Lines. The new formulation, which the Toronto (Fibre Glass) Company will produce commercially is not likely to be suitable for motor windscreens. The condition of wind pressure at high velocity is required for its completely successful use.

THE NEW PEROXIDE CATALYSTS

Means to Better Resin Polymerisation

From A SPECIAL CORRESPONDENT

THE development of new types of resins calls for new catalysts. Available to-day are some 15 different organic peroxides for the bulk polymerisation of vinyl and acrylic resins as well as the polyesters used for laminating and for moulding and casting.

Choice of a suitable catalyst is of the greatest importance to the resin manufacturer as it enables him to regulate production, using an established curing cycle at specified time and temperature. There is no such thing as a universal catalyst and each resin system usually calls for a special type of catalyst.

Manufacturers hitherto have been satisfied with one or two catalysts, benzoyl peroxide being the best known. It is now realised that this peroxide, although the most satisfactory general purpose catalyst available, has its limitations and it is not suitable for some of the new polyesters which are required to cure at room temperatures; moreover, it is not able to give the best results with polyesters to be used for casting or moulding.

Serious defects in manufactured resins such as poor colour, variable physical properties and indifferent storage characteristics can often be traced either to the use of the wrong catalyst or the maintenance of unsatisfactory conditions of polymerisation.

Six Groups

The peroxide catalysts now being employed in the plastics industry fall into six distinct groups. The most important of these is the diacyl peroxides of which benzoyl peroxide, lauroyl peroxide, 2,4-dichlorobenzoyl peroxide and *p*-chlorobenzoyl peroxide are the best known.

The aldehyde peroxides include hydroxyheptyl peroxide and dibenzaldiperoxide; the ketone peroxides consist of methyl ethyl ketone peroxide, 1-hydroxycyclohexyl ketone peroxide-1, methyl isobutyl ketone peroxide and methyl amyl ketone peroxide.

Additionally, there are alkyl hydroperoxides, such as *t*-butyl hydroperoxide; alkyl peresters like di-*t*-butyl diphenylphthalate, *t*-butyl perbenzoate and alkyl acid peresters such as *t*-butyl permaleic acid and *t*-butyl perphthalic acid. These vary in active oxygen contents from about 2.10 per cent for 2, 4-dichloroben-

zoyl to 15.50 per cent for methyl amyl ketone peroxide. Physical forms also vary; some peroxides are fine white powders, others pastes and liquids.

It has recently become the practice to use some of the peroxides compounded with plasticisers so as to improve their shelf life without loss of activity. Benzoyl peroxide is now extended with di-*n*-butyl phthalate; *p*-chlorobenzoyl peroxide compounded with tricresyl phosphate and methyl ethyl ketone peroxide dissolved in dimethyl phthalate. The extended peroxides are either pastes or viscous liquids which possess improved solubility in monomers to be polymerised.

Special Qualities

Evaluation of peroxides as catalysts is very difficult because the requirements of the resin manufacturer and resin user vary so much. It is, however, possible to summarise some of the more important of the desirable characteristics which the manufacturer looks for in new peroxide catalysts:—

1. The catalyst must be available at low cost and effective as a gelling agent at low concentrations. This is essential as competition in the plastics industry is becoming so keen that expensive catalysts may make a resin too costly to use on a large scale.

2. The peroxide should dissolve in the monomer to give a colourless solution; moreover, the presence of the catalyst in the resin should not bring about any deterioration in colour value after polymerisation.

3. The peroxide must possess a reasonably good shelf life and be suitable in one form or another; e.g., in its extended form, for shipping abroad. In the past one of the main criticisms of peroxide catalysts was that they were hazardous chemicals with doubtful and unreliable storage characteristics.

There is no doubt that the extended forms of catalysts have a greatly improved shelf life. The resin/catalyst system must additionally possess a sufficiently good tank life to allow for processing over any reasonable period; e.g., polyester resins for continuous laminating require a long tank life, whereas polyesters for casting need a comparatively short tank life. The catalyst should lend

itself to adjustment of gelation properties by varying the percentage present in the resin, but such adjustment should not be too fine.

4. The catalyst should be active at relatively low temperature, *e.g.*, 75-90°F. This is very important for contact pressure laminating, but it is not so vital for moulding compositions which are subjected to relatively high temperatures but have a slow cure period.

5. The exothermic reaction arising from the use of a catalyst in polymerisation should not be too violent, otherwise the colour of the resin is liable to be seriously impaired and other properties are also inclined to suffer. The tendency nowadays is to use catalyst mixtures composed of two organic peroxides which are able to reduce the amount of heat generated without any compensating retarding of the speed of gelation. This is particularly important in certain types of low-pressure laminating work.

6. The catalyst should not promote crazing of the resin, even when relatively high catalyst concentrations are employed. It is a practice of a number of manufacturers to increase the percentage of catalyst so as to compensate for the absence of externally applied heat. It has to be borne in mind, however, that the presence of chemical promoters, inhibitors and other additives can influence crazing and other characteristics of the polymerised resin.

Catalysts used in the plastics industry are usually grouped under such headings as low-temperature, intermediate-temperature and high-temperature, indicating the conditions under which the resins

have to be cured. Benzoyl peroxide, with an active oxygen content of 6.3 per cent, comes in the intermediate group, which includes those catalysts which are typified by their wide variation in the gelling times of polyester resin and cure rates at curing temperatures above 150°F.

Other peroxides in the intermediate group include methyl amyl ketone peroxide, with an oxygen content of 15.50 per cent; lauroyl peroxide, having an oxygen content of 3.76 per cent; *t*-butyl permaleic acid, 6.4 per cent oxygen; *t*-butyl perbenzoates, 7.8 per cent oxygen; di-*t*-butyl diperphthalate, 9.80 per cent active oxygen; *t*-butyl perphthalic acid, 6.40 per cent oxygen; and *p*-chlorobenzoyl peroxide, containing 4.90 per cent oxygen.

The low-temperature group includes hydroxyheptyl peroxide, with an active oxygen content of 5.80 per cent; methyl ethyl ketone peroxide in dimethyl phthalate, 11.06 per cent oxygen; methyl isobutyl ketone peroxide in dimethyl phthalate, possessing the same oxygen content; 1-hydroxycyclo-hexyl hydroperoxide-1, 11 per cent oxygen; dibenzaldiperoxide compounded with tricresyl phosphate, 6.60 per cent oxygen; and *t*-butyl hydroperoxide 10.60 per cent active oxygen.

Catalysts in the low-temperature groups are particularly suitable for contact pressure moulding to be carried out at 75-90°F. and casting at room temperatures. In the high-temperature group the only important peroxide is dibenzaldiperoxide, which has an active oxygen content of 6.60 per cent.

CLEANER COAL PROSPECTS—TWO YEARS HENCE?

WHAT is stated to be the largest coal cleaning plant in the country is to be installed at Lynemouth colliery, Northumberland. This part of the programme which the National Coal Board has set in motion to improve the quality of coal, is also a section of a £2½ million reconstruction scheme embracing Lynemouth and Newbiggin collieries in the northern division.

This scheme, by which production will be concentrated at Lynemouth colliery, is expected to help raise the output of coal from these collieries from 600,000 tons to 1½ million tons a year. Work on the new washery, which will cost £731,000, will be completed in about two years' time. It will clean 800 tons an hour.

Three cleaning processes will be used in

the new project. All coal between 8 in. and 1½ in. will be washed in a Ridley-Scholes washer, which was designed by two British engineers five years ago. In this method the coal is passed through a bath containing a mixture of finely ground magnetite in water. The dirt sinks, and the clean coal which floats is carried away by a stream of liquid and then drained and sprayed.

Smaller coal from 1½ in. to 1/50 in. will be treated in a separate plant designed by the Automatic Coal Cleaning Co., Ltd., of Carlisle, while the finest particles below 1/50 in. will be cleaned in a froth flotation plant designed by Unifloc Reagents, Ltd., of Swansea.

The whole installation embodying the three systems will be constructed by the Mitchell Engineering Group, of London.

MINIMISING RADIOACTIVE HAZARDS

Apparatus to Avoid Contamination

From OUR NEW YORK CORRESPONDENT

RADIOACTIVE isotopes are being increasingly used in medical, biochemical and industrial research, which involves considerable hazards for the chemist who must handle small but potent quantities of radioactive material.

To avoid contamination of the laboratory and to control these materials through normal chemical processes without losses, better apparatus is required.

A step towards minimising such dangers is a versatile and compact piece of apparatus developed by Dr. Clyde A. Dubbs, of the medical research laboratory, Veterans Administration Centre, Los Angeles, California.

The equipment consists of a simple V-shaped glass assembly which makes it possible to carry out a long series of intricate operations without transferring the material from one container to another. There is no possibility of contamination by liquids which might normally trickle down the outside surfaces of vessels during pouring, nor by particles escaping to the air or adhering to glass and filter paper.

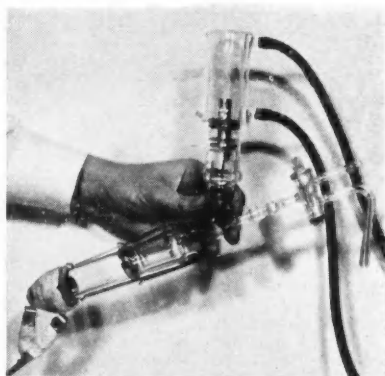
The device consists of two tubes, each having a capacity of 50 cu. cm. (a little less than 4 oz.), joined at an angle by a piece containing a stopcock.

Reducing Atmospheric Pressure

By inserting a filter disc in one of the tubes and piercing the filter with a thin hollow tube, a chemist can filter, distill, condense, centrifuge, and dry a material without taking the equipment apart. In the case of delicate biological materials which cannot be boiled at normal atmospheric pressure, the pressure can be reduced by pumping out air through the stopcock.

Dr. Dubbs has explained how a water solution of starch is prepared in his new apparatus, pointing out that material would have to be poured from one container to another five times if conventional equipment were employed.

One tube contains a leaf homogenate which has been prepared directly therein by grinding a leaf with concentrated alcohol, using a rotating pestle. Within the ground glass joint of this tube is a sieve covered with filter paper except where a small tube passes through the centre. After air has been removed, the apparatus is turned so that the alcohol filters into the second tube. Some of the homogenate is deposited on the filter



Versatile and compact apparatus for lessening laboratory radioactive contamination

paper, while much of it is left clinging to the walls of the first tube.

To wash down this residue, which is chiefly starch, the liquid in the lower tube is boiled with the aid of a heating jacket. The alcohol vapours rise into the upper tube, condense there, and trickle down the sides.

About 15 minutes later, the lower tube containing the alcohol is removed, emptied, and refilled with an acid-alcohol mixture, required to make the starch soluble in water. The apparatus is then inverted so that the acid-alcohol washes the starchy residue from the filter.

The lower tube is then heated and the liquid boiled for another 15 minutes until the starch is dissolved. Finally, the starch solution is filtered, and the entire procedure is repeated to substitute water for the acid-alcohol.

The apparatus, by providing a means of processing radioactive material (for example, the isolation of Carvon-14 glucose from a photosynthesising leaf) through a series of treatments in a closed system minimises contamination of the atmosphere with radioactivity. It thereby diminishes the health hazard and aids in maintaining a satisfactory low background count in the laboratory. The closed system feature is especially advantageous when high temperature treatments such as extraction, reflux and distillation are involved.

PROPERTIES OF LIQUID HELIUM

"A Perfect Thermal Conductor"

THE behaviour of liquid helium, which defies gravity when brought to very low temperature, has proved an unexpected asset to scientists, Dr. H. A. Fairbank, of Yale University, told a symposium of the American Chemical Society's Division of Physical and Inorganic Chemistry at its recent meeting in Pittsburgh, Pa.

Of the two isotopes of the element helium, helium-3 and helium-4, the former is so rare that its atoms are outnumbered ten million to one in the helium obtained from natural gas wells. This has made the isotope extremely difficult to study.

Fortunately, however, helium-3 is more stable than its twin, which has enabled scientists to formulate a remarkably efficient means of separating the two, Dr. Fairbank stated.

As a lightweight, non-inflammable gas, helium is used in dirigibles and in many industrial operations requiring an inert atmosphere. A mixture of helium with oxygen also has proved valuable in protecting divers from caisson disease.

Very Low Temperature

The properties of helium have aroused new interest among scientists in recent years, Dr. Fairbank said, because of the discovery of the remarkable effect of cooling the liquid element to a temperature close to absolute zero.

"When helium is cooled," he pointed out, "it remains in the gaseous state until it is lowered to within 4.2° of absolute zero, when it liquefies. The liquid behaves in a reasonably normal fashion at this temperature, but when cooled below 2.19° (above absolute zero), it is transformed into a 'superfluid' with unique and exciting properties.

"The liquid appears to be almost a perfect conductor of heat, having a heat conductivity higher than any substance known. It has very unusual flow properties and will leak through the tiniest crack. When contained in a vessel, a film will form on the walls and the liquid will creep out over the side of the vessel as long as the level outside is lower than the level inside.

"These various properties are described in current theories by assuming that liquid helium (below 2.19°) consists of two non-interacting components, one component a normal fluid with normal

fluid properties and the other a superfluid which flows without friction and in general behaves like a perfect fluid. It is possible, by applying heat to one portion of the liquid, to have a flow of superfluid helium in one direction and normal helium in the other simultaneously, with no net flow of the liquid as a whole."

Behaviour of Helium Mixtures

Investigators have been anxious to learn how a liquid containing a mixture of helium-3 and helium-4 behaves, and also what properties pure helium-3 possesses, he continued. In answering the first question, he said, a powerful method has been provided for separating the scarce helium-3 from helium-4, a development which promises to provide "fair quantities" of pure helium 3.

The helium-3 isotope participates only in the flow of the normal component and not the superfluid component of liquid helium. It has been found, for example, that helium-3 will not flow through small slits or in the film creeping up the side of a vessel containing liquid helium. In both these instances it is the superfluid which flows, and it follows, therefore, that helium-3 is not participating in the superfluid flow.

"At Yale, we have confirmed the same effect in a slightly different way by producing a flow of heat through a container of liquid helium-3 and helium-4," Dr. Fairbank continued. "In this case we find that the helium-3 flows in the direction of the heat (with the normal component of liquid helium-4) and collects in one portion of the vessel.

"Aside from the scientific interest in these facts, they provide unusually efficient means of separating the two isotopes. In particular, we have succeeded in using the latter method of enriching a sample of helium by a factor of several hundred in the helium-3 isotope."

Oil Reserves in Pakistan

Hopes that the search for oil, which has been proceeding in Pakistan since the war, may soon be rewarded by success are expressed by experts. Wells were bored at Khattian, south-east of Quetta, in 1885, but the venture was financially a failure. The main source of oil at present is the Potwar plateau, near Rawalpindi.

DEVELOPMENTS IN PLASTIC PACKAGING

Wide Adaptability of Alkathene Films

THE adaptability of some of the newer plastic materials for packaging products ranging from chemicals and engineering components to foodstuffs was called to mind in London last week by the plastics division of Imperial Chemical Industries, Ltd.

The subject was Alkathene film, the patent for which was filed in 1936. Its production was given high priority during the war for use in insulation of radar and submarine cables. It has been produced in the U.S.A. for some years under licence from I.C.I.

"Layflat" tube is a development of Alkathene film. It is produced as a thin-walled seamless tube in continuous lengths, easily cut into suitable sizes and sealed by heat.

At present layflat tube is being made in the following sizes: Film thicknesses of nominal 0.0025 in. Layflat widths of 3 in. to 5 in. in $\frac{1}{2}$ in. steps (i.e., tube diameters from 1.91 in. to 3.17 in.).

Between now and the end of 1949, enough layflat tube will be available for extensive packaging trials and market evaluation. The range is being increased to include layflat widths from 2 in. to 24 in. (i.e., 1.27 in. to 15.7 in. tube diameters) and thicknesses from 0.0015 in. to 0.005 in. Large-scale production capacity will be ready by the beginning of 1950.

The introduction of layflat tube coincides with the coming into operation of the first large-scale plant in Great Britain for the production of Alkathene film, which is producing continuous rolls up to 46 in. wide.

Chemical Container

Both the layflat tube and the film are distinguished by good transparency and high resistance to water, water vapour and chemical action, according to notes produced by the makers. They remain flexible at temperatures as low as -60°C . Under ordinary service conditions, appearance, handle and physical properties are unaffected, though prolonged exposure to bright sunlight, especially in the tropics, may cause some embrittlement.

Although it is one of the lightest plastics known, Alkathene is said to have a toughness and flexibility to make it suitable for packaging a variety of chemicals. An interesting development of this is the use of large bags which can be used inside drums enabling the latter to be kept clean



One of the more promising forms of the plastic is as a small container fabricated from the continuous tubular rolls shown here

for further use. Other industrial applications already in use are for wrapping crêpe rubber for shipment from Malaya and packaging carbon black.

The adaptability of the material to a wide variety of packing methods was shown by exhibits ranging from liquids, chemicals, and powders to foodstuffs, tools, engineering equipment and materials. Oil is one of the few unsuitable liquids, as it will gradually permeate the film.

A minor disadvantage at present is the cost, which is slightly higher than in America, where sources of cheap ethylene are an advantage. This may be rectified as soon as the new oil cracking plants are in production in the U.K.

Coloured Stainless Steel

Coloured stainless steel is reported to have been produced experimentally in Sheffield after much research.

Widening Range of South African Supplies

Committee Studies Chemical Import Control

AHEAD Advisory Committee has been established to assist the Directorate of Imports and Exports in relation to the importation of all commodities required by the chemical industry. A statement issued by the Director of Imports and Exports says that the industry, for the purpose of import control, has been divided into six groups. A group committee for pharmaceuticals has been set up, and committees for the remaining groups will be established shortly. The chairman or his deputy on all the group committees would become a member of the Head Advisory Committee for the chemical industry.

* * *

The Unico Chemical Co. (Pty.), Ltd., 47 La Rochelle Road, Johannesburg, has opened a new department for the preparation of chemicals for the tanning industry, the preservation of hides, etc.

* * *

Rapid progress is being made with the establishment of the first cement factory in Northern Rhodesia. This factory, ten miles south of Lusaka, is designed to produce up to 100,000 tons of cement a year. The limestone at the site is stated to be of high quality and has the quality of setting rapidly. The raw material is said to exist there in "unlimited quantities." Small quantities of gypsum will have to be imported. The cement works is being financed by the Colonial Development Corporation, with a contribution of £250,000 from the Northern Rhodesia Government, and is expected to cost £750,000.

* * *

Sulphonated oils, cutting oils and oils for the textile industry are now manufactured by a Port Elizabeth firm of polish and stain manufacturers. The services of highly qualified chemists have been secured and the firm claims to be in a position to supply these new lines in quantity and of a quality equal to anything produced elsewhere.

* * *

An importer of shea butter nut oil has applied to the Board of Trade and Industries for free admission of this product, which is subject to a duty of 20 per cent *ad valorem* under tariff item 202 (2). The Association of Chambers of Commerce of South Africa and the South African Soap Manufacturers' Association support the application on the grounds that the soap manufacturing industry is at present per-

mitted to import its requirements of various types of oil under rebate of duty for soap manufacturing purposes only. In view of all this support and because the supply of oils for soap making is still irregular, the board has recommended to the Government that the whole duty on these oils be rebated.

* * *

The South African Standards Bulletin reports that the first South African standardisation mark for car batteries was awarded to an East London manufacturer recently after the Bureau of Standards had completed exhaustive tests of the products. The Standards Council's specification for motor vehicle batteries, of which 1000 are made in the Union each day, sets a standard for South African batteries equal to that of imported batteries.

* * *

Lewis Berger & Sons (S.A.), Ltd., Gale Street, Durban, has recently acquired adjoining premises so that a new ball mill plant could be installed and other urgent additions made to the factory, which is producing a wide range of quality paints in regular use in the Union.

\$10 MILLION ASBESTOS PLAN

ALARGE increase in the production of Asbestos in Canada, already the source of some 70-80 per cent of total supplies in the West, is foreshadowed by the decision to spend \$10 million in developing newly discovered deposits near Larder Lake, 300 miles North-West of Ontario.

This development is proposed by the Johns-Manville Corporation which, it is understood, had formerly earmarked the expenditure for the expansion of Johns-Manville's Asbestos, Quebec. A strike there, called by a mining union of the Canadian Catholic Confederation of Labour, which has lasted more than 19 weeks, has curtailed production and is said to be responsible for the change of plan.

The Larder Lake discovery, according to Mr. L. H. Brown, chairman of the Johns-Manville Corporation, contains "fibre of unusual qualities." To aid in its exploitation, the company plans to start moving some of its equipment from Asbestos into the Larder Lake area as soon as possible.

The new find and its exploitation are regarded as highly important, because the demands for asbestos have exceeded supply for five years.

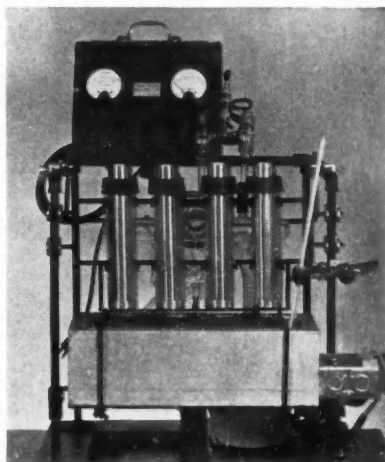
AMERICAN CHEMICAL NOTEBOOK

From OUR NEW YORK CORRESPONDENT

Molecular distillation for semi-micro analyses may be carried out on several samples simultaneously in a new still now being manufactured in the U.S.A. Operating under high vacuum to pressures as low as 1×10^{-5} mm. of mercury, the stills are used to separate heat-sensitive substances of high molecular weight. Samples are loaded into each still unit which are controlled through a resistor. The distillate collects on the condenser, which is removed to obtain the fraction after each distillation. Samples may range from a few milligrams to a gram in each still unit. This new analytical still was originally designed for use in the biochemistry department of Distillation Products, Inc., Rochester, New York, to separate vitamin E from oils extracted from foods and other biological materials. Added uses in the organic chemistry departments warranted production of a number of these stills and they are now to be available to other laboratories.

* * *

An ingenious publicity and information device at the recent annual convention of the American Waterworks Association, held in Chicago, Illinois, was an "action demonstration" of the ability of a chemical to control corrosion in a water system. Visiting municipal engineers and officials saw iron test samples rusting in plain tap water in a jar, as a result of electrolytic action, while similar iron samples remained relatively clean and corrosion-free in a duplicate jar of tap water to which small amounts of the chemical material Calgon vitreous sodium phosphate had been added. Each iron strip was connected to a copper strip in the same jar, to provide electrolytic action due to the dissimilarity of the metals. The connecting wire looped out of the water and a timer permitted breaking of the circuit on a six-second cycle. A red light flashed over each jar as the circuit from that particular jar closed and the current generated by the galvanic cell was measured by a milliammeter. At the same time the circuit in the other jar was by-passed around the meters. The amount of current flowing between the dissimilar metals is a measure of the corrosion occurring and the effect of the Calgon was to reduce the current flow almost to zero.



New U.S. molecular distillation plant

Potassium dicyanoguanidine, first described in the literature in 1945, is a stable salt which can be readily converted to the free acid, or to other salts. Many of its reactions have still to be investigated, but its availability in experimental quantities has been recently announced by the new product development department of the American Cyanamid Co., New York. Dicyanoguanidine can be isolated as a crystalline solid, which is unstable upon storage. It is readily soluble in water, and its acid strength is comparable to that of hydrochloric acid.

* * *

Triethyl phosphate, only recently made available in commercial quantities, has already found wide use in the chemical industry in a variety of applications. It is very resistant to hydrolysis at ordinary temperatures, is said to possess exceptional purity, and is soluble in water and most organic solvents. One of the major uses of triethyl phosphate is as an intermediate in the preparation of the insecticide tetraethyl pyrophosphate. The specifications, properties and uses of the chemical, and a bibliography of technical literature, are contained in a bulletin now available from the Tennessee Eastman Corporation, Kingsport, Tenn.

INDUSTRIAL VALUE OF NATURAL GAS

U.S. Source of Chemicals and Energy

ONCE an unwelcome waste-product of the oil fields, natural gas now provides one-seventh of all the energy produced in the U.S.A. It already has more than 20,000 uses in industry, states an article in a recent issue of *The Lamp*, published by the Standard Oil Company, New Jersey.

By 1925 natural gas was serving 3.5 million persons in 23 States, but still it could be used in volume only within a few hundred miles of the oil fields. Elsewhere it was unknown. Soon after, however, welded steel and seamless pipes were developed, through which gas could be pumped under high pressures, and consumption rose rapidly.

Cheapness

Natural gas is cheaper to use than either coal or oil, and it is by far the most convenient. In the U.S.A. it is estimated to cost rather more than one-third of the price of manufactured gas, although it yields twice as much heat.

Gas fresh from the well is called "wet" gas and contains hydrocarbon molecules of a wide range—from the very light to the heavier ones found in crude oil. The proportion varies but, as a fair example, the wet gas produced with oil in the Loudon pool of Illinois consists approximately of: methane 74.2 per cent, ethane 6.2 per cent, propane 9.5 per cent, butane 6.5 per cent, pentane 2.3 per cent, and hexane plus 1.3 per cent.

"Hexane plus" includes all the heavier fractions grouped for convenience.

All these fractions are fine fuels, but not all are gases. Methane, having the smallest molecules, is the lightest fraction; it remains a gas (at sea-level atmospheric pressure) even at minus 258°F., below which point it becomes liquid. But propane changes between its gas and liquid states at minus 14°, normal butane at plus 30°, normal hexane at plus 156°. Thus, at a given pressure, the fractions react differently to temperature changes.

Pressure and Temperature

Likewise, the fractions respond differently to different pressures. At a temperature of 60°, methane remains a gas under extreme pressure; propane, and especially butane, need little pressure to become liquid; and pentane and hexane are liquid at normal atmospheric pres-

sure. Thus pressure and temperature are the basic tools of the engineer to separate the components of a wet gas.

Whether it comes from an oil reservoir or a purely gas reservoir, wet gas also may contain sulphur, water, nitrogen or carbon dioxide. These impurities, like the wet fractions of the gas, usually are removed before the product is delivered into pipelines.

Chemical treatment and processing under proper conditions of temperature and pressure remove the unwanted portions. In a typical field, the resulting dry gas includes 95.7 per cent of methane and ethane, which go into the pipeline as natural gas; and 4.3 per cent of propane and butane, which are liquefied for chemical and industrial markets.

Separating the fractions of a gas, and removing the impurities, are the functions of a recovery plant making us of the temperature-pressure differences. Natural gasoline is stripped out, to become a valuable addition to regular gasoline in the refinery. Propane and butane, as raw material for chemical plants and as bottled gas, find ready markets. Heavier fractions go to a refinery to be mixed with a regular run. What is left (methane and ethane) is a good dry gas.

Eliminating Flares

As fast as steel becomes available and the economics of the situation makes it feasible, the old-time flares—symbols of an antiquated waste—are disappearing from the oil states. The industry looks forward to eliminating flares within a few years in all but the smallest fields.

Wherever cheap natural gas has become available new and often ingenious uses are being found for it, normally in association with its rôle as a fuel.

The main use of gas is in the firing of steam boilers in large electric-power plants; one such facility in Southern California can use more gas than the New England States together consume for all purposes.

The deeper drilling for oil that is now widespread is opening vast new reservoirs of gas, for deeper formations tend to have more gas than oil. Economists estimate that, by the end of 1955, the U.S.A. will have proved reserves of perhaps 200 trillion ft.—even if consumption continues to rise as in the past few years.

Technical Publications

THE American pail type of packing for exports of paints and a variety of other materials has gained wide acceptance in recent years and seems likely to increase its popularity as a result of a useful modification just introduced by Reads, Ltd., of Liverpool. The company has patented a method to permit the handles, which are prone to take up a disproportionate amount of shipping space, to be packed separately. The "ears," to which the handle was formerly permanently attached, are grooved so that the loose handle can be attached when necessary. When the handle is raised for carrying the grooves are deformed so that the handle cannot become detached.

* * *

GAS drying methods employing chemicals (such as phosphorus pentoxide, sulphuric acid, etc.), or refrigerators both have considerable disadvantages. In solid adsorption, moisture is trapped on the surface of a specially prepared porous, granular material. An advantage claimed for the Lectrodryers described in the latest catalogue of Birlec, Ltd., Birmingham, is that the activated alumina used as an adsorbent can be reactivated when heated without removal from the drying unit. Also of interest are the company's equipment for reducing humidity in the atmosphere, and air-conditioning in dry storage.

* * *

BRINGING to a total of 33 the number of safety manuals it has prepared for supervisory staffs and management in the chemical industry, the Manufacturing Chemists' Association, 246 Woodward Building, Washington 5, D.C., has announced the publication of Chemical Safety Data Sheet SD-33 on Chlorosulphonic Acid. The manual sets forth physical and chemical properties of the acid, outlines handling procedures and recommends personal protective equipment in addition to covering health hazards and their control. The manual costs 20c.

* * *

A SPANISH chemical industry directory (Anuario de la Industria Química Española), is about to be published by the Vertical Syndicate of Chemical Industry, Hermanos Becquer, Madrid. Its sections will include, in addition to names of manufacturers, products and plant makers, a good deal of background matter relating to the industry in Spain.

D



[Courtesy of Reads Ltd]

Examples of American-type pails made in the U.K. for export of paints and a variety of other materials. The patented handles may be packed separately to save shipping space

A NEW patent (No. 2,433,989), providing a means for automatically supplying distilled water to storage batteries, has been made available for licensing or sale through the United States Patent Office by Hans J. Hansen, 343 North Lorel Avenue, Chicago, Illinois. It concerns an automatic filling device for replenishing distilled water to storage batteries to maintain the battery grids submerged in the electrolyte at all times. The device, in a transparent container, employs an automatic valve which opens to establish water passage to the cells and closes when the cells are filled.

* * *

FOR spot welding the heavier gauges of sheet metal a machine embodying many new features has been designed by Philips Electrical, Ltd. Special merits of this type, E.1201, are: electronic control of the welding time incorporated in a control panel; offset secondary arms, as required for easy manoeuvrability of assemblies; welding speed up to 80 spots per minute, single or repeat spot welding, as required; fully enclosed self-lubricating control gear; and heavy duty water-cooled trans-

(continued at foot of next page)

Radioactive Isotopes and Industry

U.S. Commercial Review of Applications

RADIOACTIVE isotopes have two main fields of industrial use, of which the first is as an atomic tracer. This application offers two possibilities attainable in no other fashion—the easy detection of unweighable quantities of material (often down to a few parts per billion with an accuracy of one or two per cent), and the non-destructive differentiation of chemically identical atoms, which enables the course of the atoms to be followed through a system.

The second field of application is the utilisation of radioisotopes as compact portable sources of radiation. The radiation can be used for its effect on materials, for example, to ionise air and thus dissipate electrostatic charges, to excite fluorescence (luminous paint, standard light source), to ionise the gas in discharge tubes, etc.

Alternatively, the effect of the environment on the radiation can be put to use. For example, gamma-ray-emitting radioisotopes can be used in place of X-ray in

the practical applications of radiography. The absorption of radiation by matter is proportional to the thickness of the matter, and a thickness gauge can be built utilising this principle. If the radiation is such that a material stops it entirely, the area of the material may be measured.

Radiation is scattered by solids or liquids; this principle can be utilised in a large number of instruments such as thickness gauges, density gauges, etc.

Finally, a good many applications have been made of measuring displacements of a radioactive source through variations in ionisation current produced. Microbalances, micrometers, etc., have been designed on this principle.

These facts and other pertinent information are contained in a new 17-page booklet entitled "Industrial Uses of Radioactive Materials," now available free of charge from Arthur D. Little, Inc., chemists and engineers, Cambridge 42, Massachusetts, U.S.A.

TECHNICAL PUBLICATIONS

(continued from previous page)

former with castor copper secondary. The equipment is described in an illustrated brochure now available.

* * *

THE leading article in the current No. 4 of the Sulzer Technical Review deals with air conditioning in the textile industry, and reviews theoretical principles with a description of the methods applied and their merits. A second article examines the demands which the gas-turbine designer must make on highly heat-resisting steels, and the practical means available for determining strength properties after long working periods. Such steels are remarkable for their inclination to brittleness, which—as experiments carried out in the Sulzer laboratories have shown—is closely related to the rate of creep.

* * *

A FURTHER addition to the series of British Standards relating to chemicals for electroplating has just been published by the British Standards Institution. B.S. 1561, which relates to silver anodes and silver salts for electroplating, describes the composition and maximum limits for insoluble matter and methods

for determining the percentage of silver present and the quantity of insoluble matter.

* * *

POLISH experience gained from the first modern calcium carbide furnace to be established since the war, is described in an article by Inz. Jerzy Ruskowski in No. 2 of *Przemysł Chemiczny*. The furnace, using a continuous electrode of 10 mK power, instead of a fixed one as in the older types, is stated to effect considerable economies.

* * *

THE marked suitability of aluminium and aluminium alloy for electrical conduit and fittings is underlined in the latest leaflet issued by the Aluminium Development Association. The mechanical protection and electrical bonding provided by these materials is set out and methods of installation are described.

* * *

THE Newspaper Press Directory, founded in 1846, has been purchased by Benn Brothers, Ltd., from C. Mitchell & Co. The 1949 edition will be published in the autumn from Bouverie House, Fleet Street, and future editions will be edited and managed by the *Newspaper World*, of the Benn group of journals.

HOME

Perbunan Becomes Paracril

The name of the oil-resistant nitrile synthetic rubber and plasticiser for vinyl and phenolic resins currently marketed by the Anglo-American Oil Co., Ltd., under the name Perbunan has been changed to Paracril.

Private Control

Mr. Leslie Shaw, a Manchester accountant, director of 18 companies, has acquired control of the Birchenwood Coal and Iron Company, Stoke-on-Trent, which supplies Stoke with gas. He is stated to have secured control with a £330,000 deal after the Coal Board had dropped negotiations.

Coal Production

There was a fall last week in Britain's deep-mined coal production of 140,200 tons, due, apparently, to the beginning of the summer holidays, although it was 168,300 tons more than in the corresponding week of last year. Comparative figures are:—Last week: 4,051,000 tons (3,762,600 tons deep-mined, 288,400 tons opencast). Previous week: 4,203,400 tons (3,902,800 deep-mined, 300,600 opencast).

Dust-Free Air

In the report of the new radiochemical laboratory at the Atomic Energy Research Establishment, Harwell, issued by the Ministry of Supply recently, it was stated that the maximum rate of flow of dust-free air was equivalent to 120 complete changes per minute in a laboratory; under normal conditions the rate would not exceed 40 changes per minute. A correction from the Ministry states the figures were intended to be per hour in both cases.

Chemistry Training Prospectus

Representative facilities for training for degrees and distinctions in chemistry and other science subjects are described in the current prospectus (1949-50) of the department of chemistry and biology of the Acton Technical College. Many of the courses have been reorganised and attention is drawn to the new post-graduate courses and to the courses in chemistry and technology of plastics. A course for the Higher National Certificate in Chemistry in September, 1949, has also been arranged.

Stabilised Prices

Members of the Associated Dynamo and Motor Manufacturers in pursuance of their policy, announced over a year ago, of supporting the Government in stabilising prices, have decided not to increase prices of a.c. and d.c. motors beyond their present level.

Oil Drilling near Mansfield

The D'Arcy Exploration Company, a subsidiary of the Anglo-Iranian Oil Co., Ltd., is to make a test drilling on the outskirts of Mansfield, 12 miles from its oil field at Eakring. It is hoped to strike oil within about 3 months, before drilling reaches 2800 ft.

Oiticica Oil Price Drastically Cut

One of the largest of recent reductions in the official fixed prices of industrial vegetable oils is announced by the Ministry of Supply, to take effect on Monday next (July 18). From that date, oiticica oil, which has been fixed at £150 per ton, will be distributed by the Ministry at £100 per ton.

Coalite Refinery Progress

After unavoidable delay due to difficulty of obtaining building materials the first two new sections of the refinery of Coalite & Chemical Products, Ltd., have been put to work and a third will be ready next month. It is hoped that these additions will considerably increase refining flexibility, and by the introduction of new products will help to counter the keener competition and changed market conditions, which are referred to in the annual report of the directors.

Industrial Statistics

A formal group of the Royal Statistical Society, the South Wales Group, has now been inaugurated under the chairmanship of Dr. T. V. Starkey of the Technical College of Monmouthshire. The Industrial Applications Section, to which it is attached, is concerned with the application of statistical techniques to all aspects of industry, including industrial research, development and manufacture, and inspection and more efficient production. The secretary of the section is Miss J. Keen, G.E.C. Research Laboratories, Wembley, Middx.

PEOPLE IN THE NEWS

Non-Ferrous Metal Appointments

THE following officers have been appointed by the British Non-Ferrous Metals Federation for 1949-50: President, and chairman of the executive committee, MR. WILLIAM H. HENMAN (past-president is Mr. Horace W. Clarke); vice-presidents, MR. W. J. TERRY and MR. H. E. JACKSON; treasurer, MR. A. L. JOHNSON.

MR. DENNIS RIDER has been appointed secretary of the British Chemical Ware Manufacturers' Association, Ltd.

SIR GRAHAM CUNNINGHAM, K.B.E., chairman, Triplex Safety Glass, Ltd., and Quickfit and Quartz, Ltd., has been appointed first chairman of the Dollars Exports Board, registered last week as a company limited by guarantee "to examine all means whereby dollars may be earned or saved."

DR. ERWIN H. AMICK, JR., associate professor of chemical engineering at Columbia University, New York, is on a three-months' visit to Germany, where he will act as consultant to the U.S. Army on the breaking up of the I.G. Farben-industrie monopoly.

DR. J. G. DAVIDSON, president of the Carbide and Carbon Chemicals Corporation, New York, was one of the six foreign honorary Fellows elected at the last meeting of the Royal Society of Edinburgh.

MR. D. B. PINKNEY has been appointed assistant managing director of Short & Mason, Ltd., scientific instrument makers, London. He was with the firm's industrial application engineering department for several years prior to the war, and returned to the organisation in 1946 in the same capacity.

Next Week's Events

TUESDAY, JULY 19

Institution of Electronics

Manchester: College of Technology. Fourth annual Electronics Exhibition organised by the north-western section (until July 21).

WEDNESDAY, JULY 20

British Association of Chemists

Cambridge: 2.30 p.m. Visit to Cavendish Laboratory. 6 p.m. Physical chemistry building, H. L. Howard: "The Organisation of Chemists."

KING GEORGE'S HOUSE

Duke Re-opens John Benn Hostel

THE Duke of Gloucester, in the presence of a representative gathering of friends of the John Benn Boys' Hostels Association, on Monday performed the official re-opening of King George's House, Stockwell, now the only hostel administered by the association. The premises were badly bombed in 1941, but two wings and the common room have been restored, providing accommodation for 100 boys hitherto housed at the John Benn Hostel, Stepney. The latter is being disposed of to Dr. Barnardo's, the council having reluctantly decided that funds permit of the running of only one hostel.

The Duke was received at the entrance to King George's House by the Mayor of Lambeth (Councillor W. H. A. Porter) and Sir Ernest Benn. In an address of welcome, Sir Ernest recalled that it was the quality and success of the association's work at Stepney which attracted the attention of King George's Jubilee Trust (of which His Royal Highness is president) and led to the decision that the work must be extended. Money was provided by the trust and the obligation put upon the association to buy and equip that fine building, which H.M. the King opened a little more than 12 years ago.

The Duke of Gloucester, responding, expressed the hope that the remainder of the building would be restored and made available as soon as possible. During the past 21 years, he recalled, more than 1000 boys had passed through the hands of the association and he hoped that in future many more would enjoy similar benefits. He wished the boys now in the hostel a happy future and a life of service to the country. He declared the house re-opened, with the hope that it would give long and useful service.

A vote of thanks to the Duke was proposed by Dr. J. J. Mallon, Warden of Toynbee Hall, and seconded by the Mayor of Lambeth. Afterwards the Duke was accompanied by some of the boys on a tour of the building and stayed to tea.

Obituary

MR. SAMUEL RENTON, 70, a retired industrial chemist and a well-known Cheshire Freemason, Hartford, near Northwich, was taken ill while playing bowls on July 5 and died before the arrival of a doctor.

OVERSEAS

Cellulose from Sugar Cane

An Argentine company is reported to be contemplating the installation in Tucuman of a cellulose factory to use local sugar-cane fibre for the large-scale manufacture of paper.

German Chemicals for Turkey

An agreement has been reached by Turkey with the Anglo-American occupation authorities in Germany for a delivery of German pharmaceutical products worth approximately £250,000. Delivery will be made in instalments, owing to shortage of foreign currency.

New Punjab Oil Source

A new oil well in Pakistan has been producing 75,000 gal. daily for the past week, and production is expected to exceed 100 gallons a day, an official of the Burmah Oil Company disclosed on July 5. The company is drilling near Rawalpindi in the Punjab.

Fertiliser and Acid Plants Wanted

The official Uruguay Instituto de Quimica Industrial has invited tenders for the construction of two chemical plants, one to produce 20,000 tons of superphosphate annually, and the other 2000 kilos of hydrochloric acid daily. Offers to be presented to the offices of the Institute at Calle Bernabe Caravia 3797, Montevideo.

Argentina's Steel Plant

A steel plant to produce 700,000 to 900,000 metric tons is to be erected with United States technical aid and management assistance at the Argentine port of San Nicholas. The company concerned is the Armco International and it is reported that the U.S. Department of Commerce has granted export licences for the steel required in the construction of this plant.

Ceylon Copra

A delegation from the United Kingdom is due in Ceylon at the end of this year to discuss with representatives of the Government of Ceylon a fresh copra contract to replace the existing 1948 one. Under the present agreement Ceylon has to sell to the United Kingdom Government copra and/or oil equivalent to 40,000 tons in terms of oil during this year at the rate of £55 per ton of copra f.o.b. Ceylon ports. The Pakistan Government gets from Ceylon under the 1948 agreement 2000 tons in terms of oil and/or copra or coconut.

Refractories from Chile

An American firm proposes to install a plant at Concepcion, Chile, for the manufacture of refractory materials on a scale to satisfy local demand and leave a surplus for export. Chilean cement and nitrate interests are collaborating.

American Sulphur Record

The U.S. domestic sulphur industry produced 396,447 long tons of native sulphur during April. This is the largest April production on record. Sales of some 449,729 long tons were also a record for April.

Rayon Plant For Uruguay

American and Uruguayan interests are reported to be planning the erection of a rayon plant at Paysandu, Uruguay, at a cost of approximately 10 million Uruguayan pesos. The new plant is intended to have an annual capacity of 3 to 4 million lb. of yarn. The New York firm of Oscar Kohorn Co., Ltd., is to participate in the undertaking.

French Blast Furnaces for Yugoslavia

In a recently concluded trade agreement between France and Yugoslavia—bringing about a mutual exchange of goods valued Fr. 6 milliard within the first year—France is to supply capital goods, including new blast furnaces as well as iron and steel products. In return Yugoslavia is to send foodstuffs, timber and tobacco.

New Canadian Titanium Process

The discovery of a new process for the extraction of titanium oxide more cheaply than the present American process is announced by experts of the Dominion Magnesium Company, Renfrew, Ontario. Half the world's supply of titanium is believed to exist in the Allard Lake (Quebec), where it is estimated there are 250 million tons of ore, possibly more, which will be developed by a subsidiary of the Kennecott Copper Company.

Bolivia's Sulphuric Acid Plant

Production has now begun at the new sulphuric acid plant, La Paz, Bolivia, which was completed in April this year. The plant, stated to have cost \$71,400, was planned in 1944, but work did not begin on it until August, 1948. Consumption of sulphuric acid in Bolivia is estimated at between 300 and 600 tons annually. It is expected that the new plant, with an initial output of 1 metric ton daily, rising to 1½ tons daily, will be able to supply the most essential needs.

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ELECTRONIC PRODUCTS (GLOS.), LTD., Gloucester. (M. 16/7/49.) June 13, £6000 debenture, to J. J. Denny, London; general charge. *£4020. April 30, 1948.

HENRY HEATON & CO., LTD., Bradford. (M., 16/7/49.) June 8, by order on terms, charge, to Newcastle-on-Tyne Permanent Building Society securing £3750 and any other moneys, etc.; charged on land and buildings known as Springfield Soap Works and garages adjoining at Mumford Street, West Bowling, Bradford.

REYNOLDS SCIENTIFIC GLASS WORKS, LTD., London, S.W. (M., 16/7/49.) June 8, £1800 (not ex.) charge, to Lloyds Bank, Ltd.; charged on 53 Hanworth Road, Sunbury-on-Thames. *£375. April 20, 1949.

Company News

Coalite and Chemical Products, Ltd.

Credit balance on the profit and loss account for the year ended March 31, amounted to £378,944, to which has been added sundry income from investments, totalling £5059, making a gross figure of £384,003. Group net profit for the year was £151,932. A final dividend of 2 per cent on ordinary stock is proposed.

The following increases in registered capital are announced: **TRICANA, LTD.,** from £100 to £5000; **EGYPTIAN CHEMICAL & DRUG INDUSTRIES, LTD.,** from £50,000 to £60,000.

The address of **VOSS INSTRUMENTS, LTD.,** has been changed to Faraday Court, High Street, Maldon, Essex.

New Companies Registered

Bury Solvents, Ltd.

Private company. (470,452). Capital £1000. Manufacturers of solvent oils,

chemicals, fertilisers, colours, glues, varnishes and compositions, etc. Directors: R. A. Ramage and C. Ramage. Reg. office: 36 Bolton Street, Bury.

Dollars Export Board

Registered July 4 (470,455), as a company limited by guarantee without share capital and with 20 members. To initiate and co-ordinate proposals for new activities and for increasing existing activities in the Canadian and United States and other dollar markets; to examine means whereby dollars may be earned or saved; and to consult with trade associations and Government departments, etc.

T. W. Fields (Chemists), Ltd.

Private company. (470,556). Capital £4000. Manufacturing chemists. Directors: C. W. Simpson, K. Simpson. Reg. office: 9 North Bar Within, Beverley, East Yorks.

Firmenich & Company, Ltd.

Private company. (470,401). Capital £10,000. Manufacturers of chemicals. Director: A. Firmenich. Solicitors: Denton Hall & Burgin, 3 Gray's Inn Place, W.C.1.

G. Samuel Mason (Chemical Engineers), Ltd.

Private company. (470,508). Capital £5000. Objects: To acquire the business of a consulting chemical engineer, etc., now carried on by G. S. Mason, at 25 Devonshire Street, Keighley. Directors: G. S. Mason, F. M. Mason and G. F. P. Mason. Reg. office: 25 Devonshire Street, Keighley.

Taragene, Ltd.

Private company. (470,477). Capital £1500. Industrial chemists. Directors: E. Wild and F. H. Wild. Reg. office: Llan Pentre, Old Colwyn, Denbigh.

Union Crystalex Gelatine, Ltd.

Private company. (470,600). Capital £100. Manufacturers of chemical foods. Director: A. A. Boucher. Reg. office: Cransley Works, Garrett Street, Golden Lane, E.C.1.

Chemical and Allied Stocks and Shares

THE stock market showed little business early this week, influenced by the Parliamentary debate on economic affairs, and British Funds were inclined to lose ground. The latter effect is associated with the knowledge that further 3 per cent Gas Stock would be issued as compensation. Industrial investments generally were firmer, particularly those industries capable of earning dollars.

Copper, tin and shares of other base metal mines were inclined to lose part of earlier gains, the decision to keep the London Metal Exchange closed affecting sentiment. Copper and other metal prices have again been reduced to bring them into line with those in the U.S.; and it appears that bulk buying of metals in a falling market is likely to result in a big loss which will have to be met by taxpayers.

Reflecting the general trend in industries, chemical and kindred shares have shown small irregular movements, although gains of a few pence predominated. Imperial Chemical firmed up to 44s. 1½d., Monsanto have been firm at 50s. and Albright & Wilson 6d. "off" at 27s. 9d. Boake Roberts were steady at 30s. and Brotherton 10s. shares changed hands around 20s. F. W. Berk 2s. 6d. shares were 13s., Amber Chemical 2s. shares 5s., and Pest Control 5s. shares eased to 8s. 1½d. Sanitas Trust 10s. shares were 26s. 3d. and B. Laporte 5s. shares changed hands around 20s. still affected by the share bonus news. Among preference shares, L. B. Holliday 4½ per cent were 21s. 9d., W. J. Bush 5 per cent 24s. 9d. and British Chemicals and Biologicals 4 per cent 20s.

United Molasses at 39s. and the 4s. units of the Distillers Co. at 26s. 6d. were favoured among shares of companies which are important dollar earners. Turner & Newall were also better at 73s. 3d., Borax Consolidated kept at 50s., British Aluminium were 43s. 9d. and British Oxygen (92s. 9d.) turned firmer. Later, however, prices eased again.

British Glues & Chemicals 4s. ordinary were fairly steady at 18s., with the 8 per cent participating preference at 38s. 1½d. Earlier in the week hopes of reopening of the London Metal Exchange put Amalgamated Metal shares 1s. up at 18s. 3d. while Metal Traders gained 2s. but later news caused much of the earlier gains to be lost. A steadier tendency continued in iron and steels, Dorman Long being 29s., United Steel 26s. 7½d., Stewarts & Lloyds 53s. 6d. and Guest Keen 37s. 6d. Babcock & Wilcox were firm at 57s. 9d. "ex rights" to the new shares.

Boots Drug recovered to 49s. 3d. in anticipation of the full results and chairman's annual statement, but Beechams deferred fluctuated around 12s. 3d., awaiting the dividend announcement. Sangers were 29s., British Drug Houses 5s. shares changed hands around 7s., and in other directions, Glaxo Laboratories were £17½. Shares of companies with plastics and allied interests remained uncertain, De La Rue at 26s., British

Industrial Plastics 2s. shares 4s. 6d. and British Xylonite 67s. 6d. Elsewhere, Coalite & Chemicals 2s. shares were 2s. 1½d.

British Chemical Prices

Market Reports

A MODERATELY active interest continues to be sustained in the chemicals market this week, with the movement to the textile, plastics and other consuming industries covering reasonably good volumes for the time of year. Overseas inquiry, particularly for Empire destinations, has again been good and the improvement in supplies is well maintained. Prices have shown no further changes of importance on the week but reductions in prices of non-ferrous metal compounds may be expected shortly as the result of the decrease in the controlled prices of the metals. A brisk inquiry has been reported for caustic soda, soda ash and bicarbonate of soda, and the soda products generally continue in good request. There is nothing fresh to report concerning the potash compounds. Other items for which there is a good demand include borax, bleaching powder and hydrogen peroxide. Quiet conditions prevail on the coal-tar products market and competition in the export markets is keener.

MANCHESTER.—When allowance is made for the continued effect of holiday stoppages at consuming works, trading conditions on the Manchester chemical market may be described as reasonably satisfactory, from the point of view both of the movement of supplies into consumption and the volume of replacement business in the home section of the market. Users are calling for steady deliveries of caustic soda and the other alkalis and also of a wide range of other chemicals, while a fair amount of new inquiry on export account continues to be dealt with. Few fresh prices changes of any consequence fall to be recorded. In the fertiliser market trade generally is at a seasonally low level, and in the tar products section many lines are meeting with no more than a moderate demand.

GLASGOW.—The volume of business being transacted in the Scottish chemical market is now on a reduced scale, due to the holiday season. No particular demands have been noted and it is not likely that there will be much activity for a few weeks. The downward trend of prices has continued. The export market is also quiet.

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Dispersion of carbon black.—J. M. Huber, Inc. Nov. 28, 1945. 622,664.

Utilisation of atmospheric or gas pressure to augment power units.—F. J. H. Phillips. Aug. 13, 1946. 622,665.

Process for manufacturing pipes and other hollow bodies of plastic material.—E. V. Fejmert. Aug. 20, 1946. 622,831.

Protective device against poisonous gases and dust for factory and like workers.—M. Christensen. Aug. 23, 1946. 622,486.

Electrical insulation containing synthetic resin.—I.C.I., Ltd., A. A. Drummond, and B. Jacob. Sept. 13, 1946. 622,671.

Manufacture of synthetic resinous condensation products.—I.C.I., Ltd., D. Atherton, and W. Charlton. Oct. 2, 1946. 622,675.

Electrolytic polishing of silver.—Westinghouse Electric International Co. July 20, 1945. 622,750.

Coloration of yarn or fabrics composed wholly or partly of secondary or acetone-soluble cellulose acetate.—T. E. Marchington & Co., Ltd., and G. D. Sutton. Oct. 8, 1946. 622,676.

Treatment of waste laundry effluents.—A.S.P. Chemical Co., Ltd., C. L. Walsh, and B. A. Adams. Oct. 23, 1946. 622,494.

Treatment of laundry and the like trade effluents.—A.S.P. Chemical Co., Ltd., C. L. Walsh, and B. A. Adams. Oct. 23, 1946. 622,495.

Method of stabilising dried starch syrup.—T. Nordenskjold, and E. A. Johnsson. Dec. 10, 1945. 622,687.

Production of alkylated phenols.—Firestone Tyre & Rubber Co. March 8, 1946. 622,690.

Processes and apparatus for treating sewage.—G. R. Scott (Electrical), Ltd., and G. P. Scott. Dec. 12, 1946. 622,691.

Esters of alphaformylphen-acetic acid.—Merck & Co., Inc. Dec. 21, 1945. 622,504.

Phenol-aldehydeamine condensation products.—Bakelite Corporation. Jan. 8, 1946. 622,758.

Liquid atomising methods.—J. J. Estignard-Bluard. Feb. 2, 1946. 622,759.

Apparatus for the manufacture of chemical substances.—I.C.I., Ltd. (African Explosives & Chemical Industries, Ltd.). Jan. 14, 1947. 622,697.

Process for the manufacture of pentaenes.—Roche Products, Ltd. (Hoffmann-La Roche & Co., A.G., F.) Feb. 20, 1947. 622,510.

Treatment of liquids with gases or vapours.—I.C.I., Ltd., and O. G. Dixon. Feb. 21, 1947. 622,706.

Aqueous emulsions, latices, or dispersion of polymers and interpolymers of vinyl chloride.—I.C.I., Ltd., and A. K. Sanderson. Feb. 21, 1947. 622,511.

Methods of preparing hydrocarbon-substituted halogenosilanes.—British Thomson-Houston Co., Ltd. March 18, 1946. 622,516.

Coal-treating solutions.—B. G. Robertson. Nov. 4, 1946. 622,517.

Process for producing pigmented rubber.—Harmon Color Works, Inc. Feb. 8, 1944. 622,518.

Process for the manufacture of α -gamma-bibonic-acid lactone.—F. Hoffmann-La Roche & Co., A.G. April 2, 1946. 622,529.

Manufacture of ultra-violet transmitting high silica glass articles.—Corning Glass Works. March 28, 1946. 622,530.

Electrodeposition of nickel, and electrolytic cells.—Mond Nickel Co., Ltd. April 12, 1946. 622,531.

Process of producing diphenylacetonitrile and the product resulting therefrom.—E. Lilly & Co. July 15, 1946. 622,559.

Process for extracting gallium oxide from aluminous substances.—Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges & Camargue. Dec. 30, 1946. 622,560.

Manufacture of di(alkoxyphenyl) haloethanes.—I.C.I., Ltd. March 27, 1946. 622,561.

Production of antibiotic substances.—Boots Pure Drug Co., Ltd., R. Michaelis, and D. A. Peak. March 27, 1947. 622,564.

Process for reclaiming vulcanised rubber scrap.—United States Rubber Co. June 5, 1946. 622,576.

Heat-treatment of metals.—Communications Patents, Ltd., and R. L. Stephens. March 28, 1947. 622,577.

Bright nickel plating.—W. W. Triggs. (Harshaw Chemical Co.). March 31, 1947. 622,761.

Mixing or agitating apparatus.—E. J. G. Huybregths. April 8, 1946. 622,590.

Method of heating or hydration of fibrous cellulosic material.—H. E. Anderson. April 2, 1947. 622,718.

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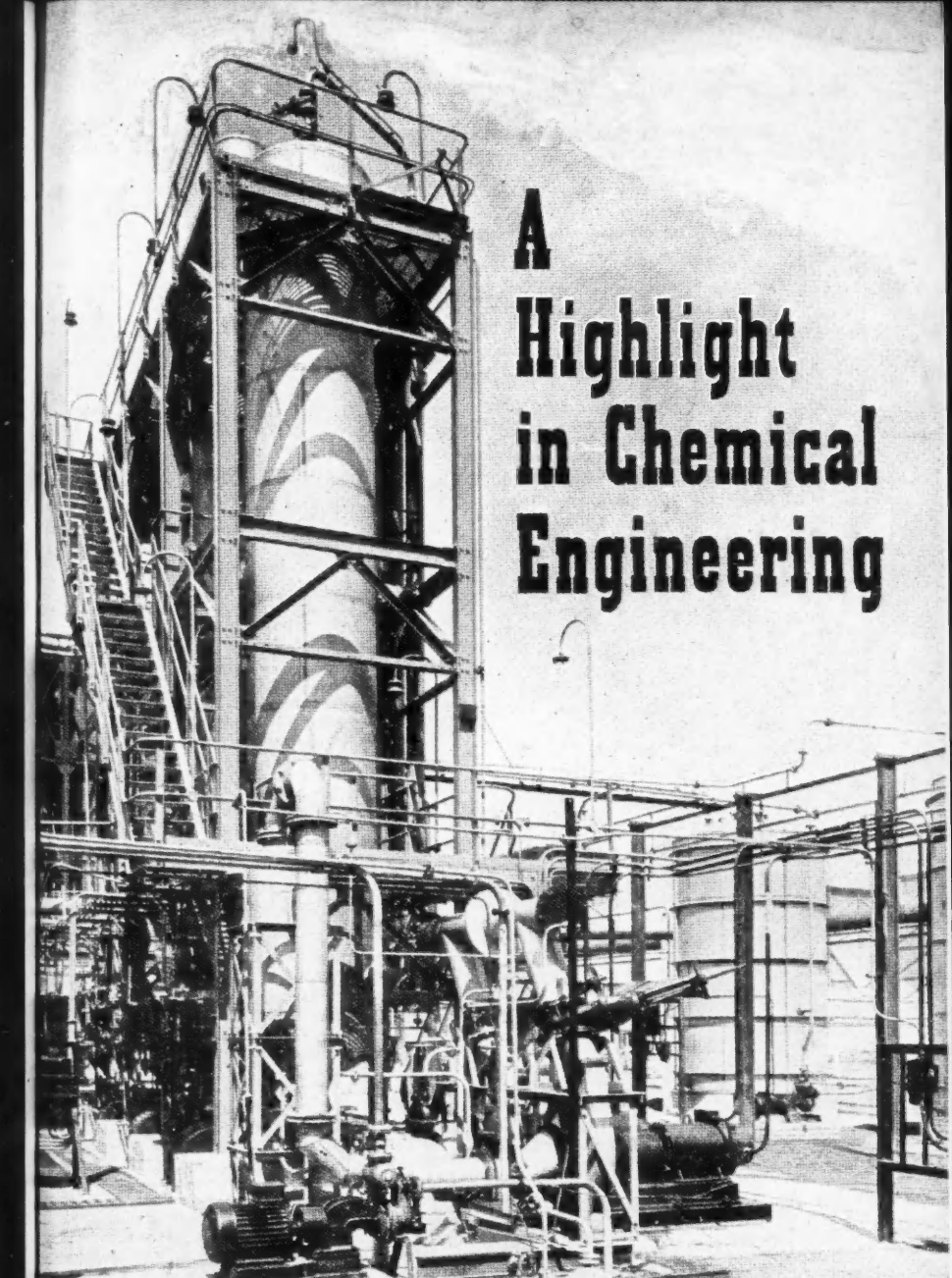
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Fluid flowmeters.—British Celanese, Ltd. April 5, 1946. 622,723.

Spraying-machine.—Pest Control, Ltd., E. J. Marshall, and W. H. Goddard. April 3, 1947. 622,780.

Handling of particulate materials.—I.C.I., Ltd., and E. J. Challis. April 9, 1947. 622,864.

Surface finishing or polishing apparatus.—A. Scrivener, Ltd., and A. Scrivener. April 15, 1947. 622,887.

Manufacture of optically active acids and derivatives thereof.—Ciba, Ltd. April 30, 1946. 622,892.

Felted fibrous cellulosic products of improved wet strength and methods of producing same.—American Cyanamid Co. July 31, 1942. 622,905.

Systems for circulating cooling fluid through electrical apparatus.—British Thomson-Houston Co., Ltd. Feb. 15, 1944. 622,907.

Process and apparatus for the depolymerisation or degradation of natural or synthetic rubber in the crude state and for the regeneration of vulcanised or partly vulcanised rubber.—Soc. Electro-Cable, and A. Lemerrier. March 2, 1944. 622,914.

Air eliminating device for conduits or capacities containing liquids.—Soc. Olaer Marine. Nov. 14, 1941. 623,004.

Production of filter elements for use in chemical reaction towers, drying towers and the like.—Solvay & Cie. March 5, 1941. 623,005.

Process for the production of sulphur.—J. C. Arnold. (Standard Oil Development Co.) April 15, 1946. 623,264.

Elements displaceable in a predetermined path and the electrical actuation of recording or other gear according to the displacements of the elements.—Delta Metal Co., Ltd., and A. W. H. Dick. June 6, 1946. 622,934.

Process for the production of insoluble macro-molecular azo compounds.—Norsk Hydro-Elektrisk Kvaestofaktieselskab, June 15, 1945. 622,935.

Systems comprising a hot-gas reciprocating engine.—N.V. Philips' Gloeilampenfabrieken. June 28, 1945. 623,090.

Method of producing iron in pure or alloyed state.—E. G. R. Angel. June 30, 1945. 623,193.

Solvent extraction devices.—W. M. Waller, and P. H. Waller. July 11, 1946. 623,195.

Method and apparatus for the deposition of an aluminium coating on ferrous metal strip or sheet.—Chemal Trust. Oct. 29, 1945. 623,212.

Production of alkyl silicones.—Soc. des Usines Chimiques Rhone-Poulenc. March 26, 1946. 623,206.

Polymers of monomeric organic compounds and method of producing the same.—B. F. Goodrich Co. March 13, 1944. 622,944.

Manufacture of styrene-oil interpolymers and of coating compositions formed therefrom.—L. Berger & Sons, Ltd., L. E. Wakeford, F. Armitage, R. H. Buckle, and E. Booth. [Legal representatives of D. H. Hewitt (deceased)]. Nov. 12, 1946. 622,948.

Resin-modified styrene co-polymers.—L. Berger & Sons, Ltd., L. E. Wakeford, F. Armitage, R. H. Buckle, and E. Booth. [Legal representatives of D. H. Hewitt (deceased)]. Nov. 12, 1946. 622,949.

2-Methyl-4-chlorophenoxyacetic acids.—I.C.I., Ltd., and F. Talbot. Dec. 13, 1946. 623,217.

Organosilicon halides.—Dow Chemical Co. Feb. 4, 1946. 622,970.

Tetrazolyl disulphides as stabilising agents for silver-halide emulsions.—General Aniline & Film Corporation. April 25, 1946. 623,112.

Production of 3, 3, 3, trifluoro-1, 1, 2-trichloropropene-1.—I.C.I., Ltd., J. W. C. Crawford, and E. R. Wallsgrove. Feb. 17, 1947. 623,227.

Production of 2-hydroxy-4-aminobenzoic acid.—A/B Ferrosan. Dec. 7, 1945. 623,114.

Organic silicon derivatives.—Soc. des Usines Chimiques Rhone-Poulenc. Nov. 29, 1946. 622,985.

Methods of manufacturing bituminous materials.—N.V. Philips' Gloeilampenfabrieken. Aug. 11, 1944. 623,241.

Preparation of sulphuric esters.—Boots Pure Drug Co., Ltd., and W. F. Short. April 17, 1947. 623,242.

Recovery of precious metal values by cyanidation.—American Cyanamid Co. Aug. 10, 1946. 623,147.

Manufacture of synthetic resinous compositions.—British Resin Products, Ltd. F. S. Deutsch, and L. M. Read. April 23, 1947. 623,271.

Preparation of carboxyalkyl ethers of cellulose.—Hercules Powder Co. Dec. 10, 1946. 623,276.

Selenium rectifiers.—J. Lucas, Ltd., H. Silman, and A. Freeman. April 23, 1947. 623,163.

Production of polyesters.—J. W. Fisher, and J. Lincoln. April 28, 1947. 623,309.

Preparation of N-aryl-2,4-diketo-tetrahydroquinoline.—General Aniline & Film Corporation. June 14, 1946. 623,323.

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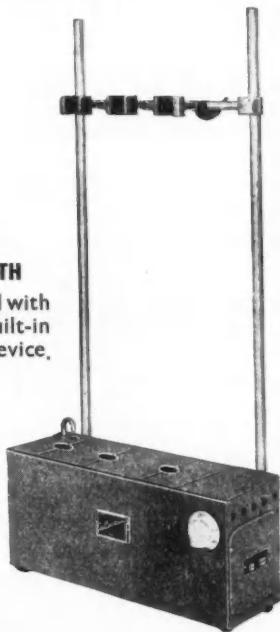
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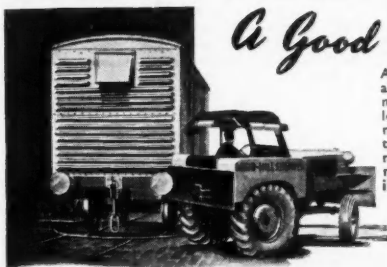
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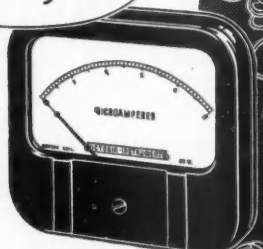
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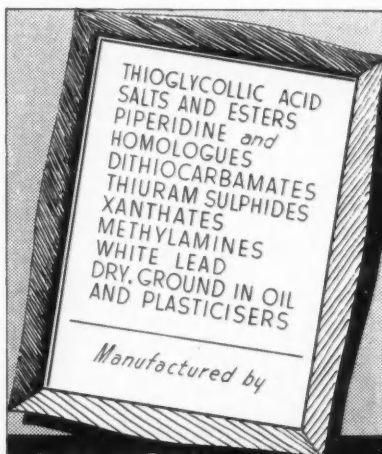
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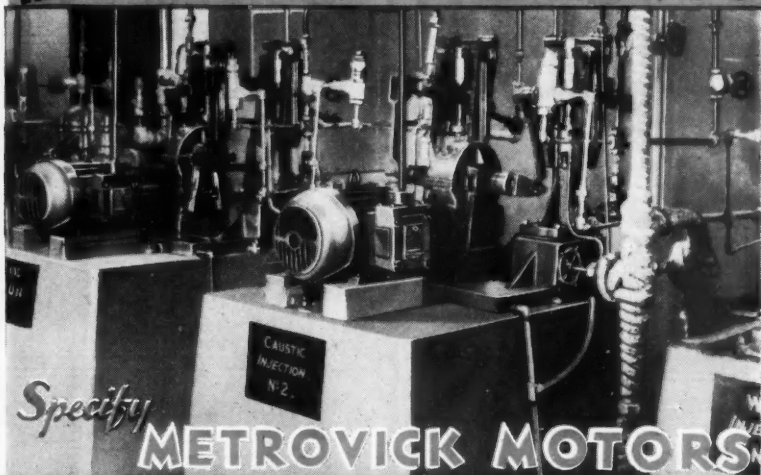


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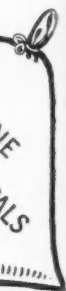
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